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IDENTIFIERS	Canvas; Sewing Machine Repairers; Webbing

ABSTRACT

Designed to provide a knowledge of skills required to alter and repair individual clothing, textile, canvas, and webbed items, the materials include teaching guides, student workbooks, and texts. One of a number of military-developed curriculum packages selected for adaptation to vocational instruction and curriculum development in a civilian setting, the course is divided into nine subject areas covering 218 hours of instruction. Subject areas and number of lessons and total hours are as follows: (1) Inspecting, Marking, Classifying, Resizing (3 lessons, 3 hours), (2) Hand Sewing Clothing (1 lesson, 1 hour), (3) Clothing and Textile Repair, Sewing Machines (11 lessons, 18 hours), (4) Machine Sewing Clothing and Textiles (13 lessons, 46 hours), (5) Clothing and Textile Shop Operations (2 lessons, 14 hours, (6) Nomenclature, Inspection, Hand Repairs to Canvas (7 lessons, 24 hours), (7) Canvas Repair Sewing Machines (14 lessons, 30 hours), (8) Canvas Repair Shop Operations (1 lesson, 14 hours), and (9) Tailoring (12 lessons, 68 hours). Printed instructor materials include lesson plans with both objectives and text references. Practical and written exams for subject areas 6-8 listed above are also included. Student workbooks and texts include many drawings. Videotapes suggested under audiovisual aids are not included. (MEK)

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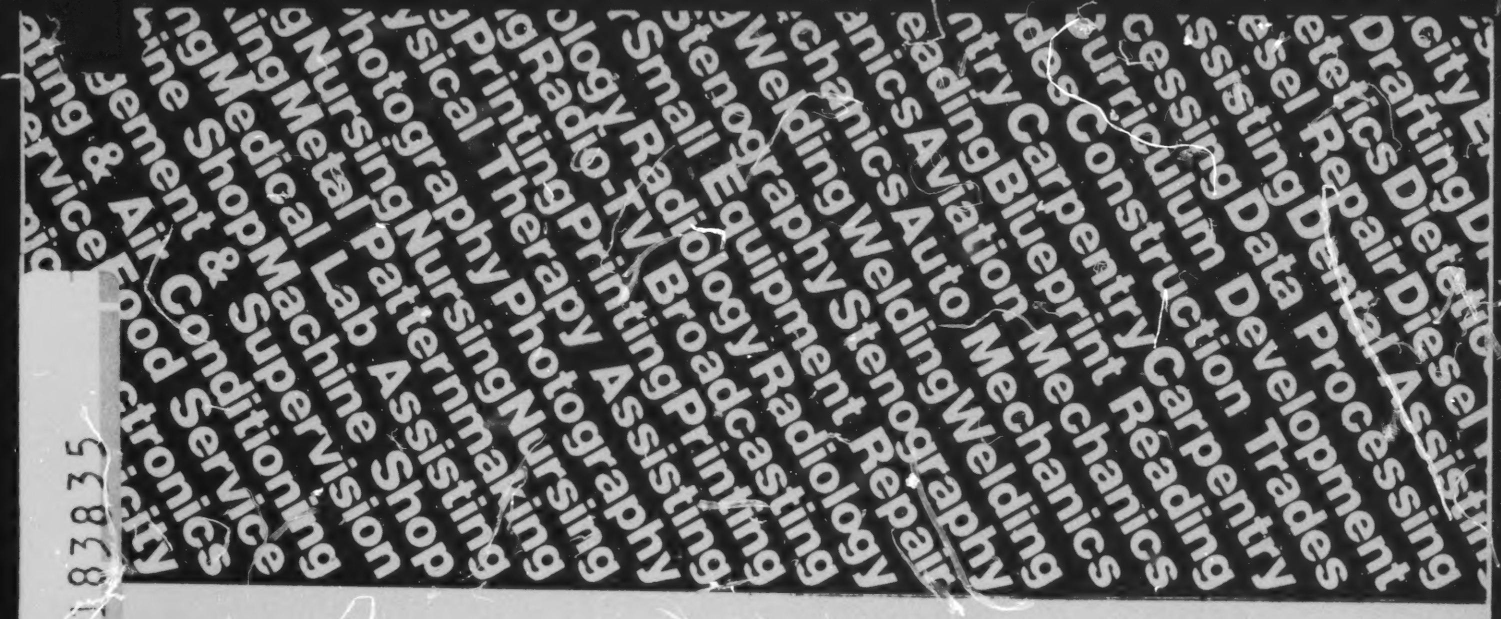

ED 183835

CE 024 400

Military Curricula for Vocational & Technical Education

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FABRIC REPAIR SPECIALIST
18-1

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EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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THE NATIONAL CENTER
FOR RESEARCH IN VOCATIONAL EDUCATION
THE OHIO STATE UNIVERSITY

This military technical training course has been selected and adapted by The Center for Vocational Education for "Trial Implementation of a Model System to Provide Military Curriculum Materials for Use in Vocational and Technical Education," a project sponsored by the Bureau of Occupational and Adult Education, U.S. Department of Health, Education, and Welfare.

MILITARY CURRICULUM MATERIALS

The military-developed curriculum materials in this course package were selected by the National Center for Research in Vocational Education Military Curriculum Project for dissemination to the six regional Curriculum Coordination Centers and other instructional materials agencies. The purpose of disseminating these courses was to make curriculum materials developed by the military more accessible to vocational educators in the civilian setting.

The course materials were acquired, evaluated by project staff and practitioners in the field, and prepared for dissemination. Materials which were specific to the military were deleted, copyrighted materials were either omitted or approval for their use was obtained. These course packages contain curriculum resource materials which can be adapted to support vocational instruction and curriculum development.

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- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

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Military Curriculum Materials
WRITE OR CALL

Program Information Office
The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road, Columbus, Ohio 43210
Telephone: 614/486-3655 or Toll Free 800/848-4815 within the continental U.S. (except Ohio)

THE NATIONAL CENTER
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Military Curriculum Materials for Vocational and Technical Education

Information and Field Services Division

The National Center for Research in Vocational Education

Military Curriculum Materials Dissemination Is . . .

an activity to increase the accessibility of military-developed curriculum materials to vocational and technical educators.

This project, funded by the U.S. Office of Education, includes the identification and acquisition of curriculum materials in print form from the Coast Guard, Air Force, Army, Marine Corps and Navy.

Access to military curriculum materials is provided through a "Joint Memorandum of Understanding" between the U.S. Office of Education and the Department of Defense.

The acquired materials are reviewed by staff and subject matter specialists, and courses deemed applicable to vocational and technical education are selected for dissemination.

The National Center for Research in Vocational Education is the U.S. Office of Education's designated representative to acquire the materials and conduct the project activities.

Project Staff:

Wesley E. Budke, Ph.D., Director
National Center Clearinghouse

Shirley A. Chase, Ph.D.
Project Director

What Materials Are Available?

One hundred twenty courses on microfiche (thirteen in paper form) and descriptions of each have been provided to the vocational Curriculum Coordination Centers and other instructional materials agencies for dissemination.

Course materials include programmed instruction, curriculum outlines, instructor guides, student workbooks and technical manuals.

The 120 courses represent the following sixteen vocational subject areas:

- Agriculture
- Aviation
- Building & Construction Trades
- Clerical Occupations
- Communications
- Drafting
- Electronics
- Engine Mechanics
- Food Service
- Health
- Heating & Air Conditioning
- Machine Shop
- Management & Supervision
- Meteorology & Navigation
- Photography
- Public Service

The number of courses and the subject areas represented will expand as additional materials with application to vocational and technical education are identified and selected for dissemination.

How Can These Materials Be Obtained?

Contact the Curriculum Coordination Center in your region for information on obtaining materials (e.g., availability and cost). They will respond to your request directly or refer you to an instructional materials agency closer to you.

CURRICULUM COORDINATION CENTERS

EAST CENTRAL
Rebecca S. Douglass
Director
100 North First Street
Springfield, IL 62777
217/782-0759

NORTHWEST
William Daniels
Director
Building 17
Airdustrial Park
Olympia, WA 98504
206/753-0879

MIDWEST
Robert Patton
Director
1515 West Sixth Ave.
Stillwater, OK 74704
405/377-2000

SOUTHEAST
James F. Shill, Ph.D.
Director
Mississippi State University
Drawer DX
Mississippi State, MS 39762
601/325-2510

NORTHEAST
Joseph F. Kelly, Ph.D.
Director
225 West State Street
Trenton, NJ 08625
609/292-6562

WESTERN
Lawrence F. H. Zane, Ph.D.
Director
1776 University Ave.
Honolulu, HI 96822
808/948-7834

FABRIC REPAIR SPECIALIST

760-43M10

Classroom Course 18-1

Developed by:

United States Army

Development and Review Dates:

April 1976

Occupational Area:

Textiles

Target Audiences:

Grade 11 - Adult

Print Pages: 1053

Microfiche: 18

Availability:

Vocational Curriculum Coordination Centers

Contents:	Type of Materials:						Instructional Design:				Type of Instruction:	
	Lesson Plans:	Programmed Text:	Student Workbook:	Handouts:	Text Materials:	Audio-Visuals:	Performance Objectives:	Tests:	Review Exercises:	Additional Materials Required:	Group Instruction:	Individualized:
Annex B - Inspecting, Marking, Classifying, Resizing Clothing	●		●		x	x	●		●	x	●	
Annex C - Hand Sewing Clothing	●		●		x		●		●	x	●	
Annex D - Clothing and Textile Repair Sewing Machines	●		●		x	x	●			x	●	
Annex E - Machine Sewing Clothing and Textiles	●		●		x	x	●			x	●	
Annex G - Clothing and Textile Shop Operations	●		●		x		●			x	●	
Annex H - Nomenclature, Inspection Hand Repairs to Canvas	●				●	x	●	●		x	●	
Annex I - Canvas Repair Sewing Machines	●				●	x	●	●		x	●	
Annex L - Canvas Repair Shop Operations	●				●		●	●		x	●	
Annex N - Tailoring	●		●		x	x	●			x	●	

X Materials are recommended but not provided.

Course Description:

The course is designed to provide a knowledge of skills required to alter and repair individual clothing, textile, canvas, and webbed items. The course contains 9 subject areas covering 218 hours of instruction. Annex A, F, J, K, M have been removed due to the military specific material contained.

Annex B - Inspecting, Marking, Classifying, Resizing consists of 3 lessons covering 3 hours of instruction.
  Inspection and Marking of Clothing Defects (1 hour)
  Classification of Clothing (1 hour)
  Measuring, Resizing, and Folding of Clothing (1 hour)

Annex C - Hand Sewing Clothing contains one lesson covering one hour of instruction.

Annex D - Clothing and Textile Repair Sewing Machines consists of 11 lessons requiring 18 hours of instruction.
  Introduction (1 hour)
  Operator's Maintenance (2 hours)
  Light Duty Sewing Machine (4 lessons, 7 hours)
  Darning Machine (2 lessons, 4 hours)
  Button Machine (2 lessons, 3 hours)
  Detecting and Correcting Malfunctions (1 hour)

Annex E - Machine Sewing Clothing and Textiles contains 13 lessons covering 46 hours of instruction.
  Simple Seams and Seam Types #1-#4 (5 lessons, 15 hours)
  Darns and Patches (4 lessons, 13 hours)
  Trouser Pockets and Zippers (4 lessons, 18 hours)

Annex G - Clothing and Textile Shop Operations has 2 lessons covering 14 hours of instruction.
  Maintenance Records (2 hours)
  Clothing and Textile Shop Operations (12 hours)

Annex H - Nomenclature, Inspection, Hand Repairs to Canvas consists of 7 lessons requiring 24 hours of instruction.
  Use of Canvas, Webbing and Hardware (1 hour)
  Inspection of Tents (5 hours)
  Grommets and Fasteners (2 lessons, 4 hours)
  Chemical Treatment of Canvas (1 hour)
  Ropes, Knots, and Hitches (11 hours)
  Hand Repairs Exam (2 hours)

Annex I - Canvas Repair Sewing Machines contains 14 lessons covering 30 hours of instruction.
  Introduction (1 hour)
  Operator's Maintenance (2 hours)
  Heavy Duty Machine, Model 7-33 (5 lessons, 9 hours)
  Medium Duty Machine (4 lessons, 6 hours)
  Heavy Duty Machine, Models 144W304 and 145W304 (3 lessons, 12 hours)

Course Description: (cont.)

Annex L - Canvas Repair Shop Operations has one lesson requiring 14 hours of instruction.

Annex N - Tailoring consists of 12 lessons covering 68 hours of instruction.
Seams #5 and 6 (3 lessons, 8 hours)
Basting, Felling, and Cross Stitches (6 hours)
Shortening Sleeves (2 lessons, 7 hours)
Shortening Trousers (3 lessons, 18 hours)
Waist and Crotch Alteration on Trousers (2 lessons, 21 hours)

The course contains both teacher and student materials. Printed instructor materials include lessons plans with objectives and references and practical and written exams for Annex H, I, and L. Student materials include workbooks/texts which include many drawings. The videotapes listed under audio-visual aides are not included.

U.S. Army Fabric Repair Specialist 760-43M10
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U. S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

APRIL 1976

PROGRAM OF INSTRUCTION

FOR

760-43M10

FABRIC REPAIR SPECIALIST

ARMY/NAVY/MARINE

MOS: 43M10

LENGTH: PEACETIME - 7 WEEKS, 3 DAYS
MOBILIZATION - 6 WEEKS, 2 DAYS

APPROVED BY THE COMMANDING GENERAL
U. S. ARMY TRAINING - DOCTRINE COMMAND
2 APRIL 76

This POI supersedes draft POI for Canvas and Webbed Equipage Repair dated Feb 1975 and POI for Textile Repair dated Aug 1974.

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Section I - Preface

A. Course: Fabric Repair Specialist 760-43M10

B. Purpose: To provide enlisted personnel with a knowledge of the skills required to alter and repair individual clothing, textile, and canvas and webbed items. MOS for which trained: Fabric Repairman (43M10)

SEE NOTE BELOW.

Section IV

Annex B - Inspecting, Marking, Classifying, Resizing.

Purpose - To provide the student with knowledge of inspecting, marking, classifying, measuring and resizing of clothing.

File No		Hrs	Clas	Type of Instruction
FR-B-1-PFS	Inspection and Marking of Clothing Defects			
Hours		1	U	.3TV, .7PE1
Objective:	Inspect clothing, locate defects, and mark clothes using standard defect symbols.			
Ref:	Sec I, TM 10-267; Sec III, QMS 200.W1, Part 1; VT 770-101-0079B, Inspection and Defect Marking of Clothing; QMS 200.2			
FR-B-2-PFS	Classification of Clothing			
Hours		1	U	.5P1, .5PE1
Objective:	Identify and use clothing classification symbols and standards.			
Ref:	AR 32-15; Sec IV, QMS 200.W1, Part 1; OMS 200.3			
FR-B-3-PFS	Measuring, Resizing, and Folding of Clothing			
Hours		1	U	.5P1, .5PE1
Objective:	Measure, resize, mark, and fold clothing.			
Ref:	Sec V, QMS 200.W1, Part 1; QMS 200.4			

NOTE: SECTIONS II & III HAVE BEEN DELETED DUE TO MILITARY SPECIFIC INFORMATION.

Section IV

Annex C - Hand Sewing Clothing

Purpose - To provide the student with a knowledge of how to use hand sewing oools and implements, and how to construct hand sewn stitches used in clothing repair.

File No		Hrs	Clas	Type of Instruction
FR-C-1-PFS	Hand Sewing Tools and Implements; Techniques of Hand Sewing, and Sewing Buttons.			
Hours		1	U	.2TV, .8PE1

Objective: Select and use each hand tool and implement, manipulate the needle and thimble, and sew on buttons.

Ref: Sec II, TM 10-267; Sec VII, QMS 200.W1, Part 1; TF 7717, Sewing Fundamentals; QMS 200.6

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Section IV

Annex D - Clothing and Textile Repair Sewing Machines

Purpose - To provide the student with a knowledge of operator maintenance, adjustments, troubleshooting and operation of Clothing and Textile Repair Sewing Machines to include the light duty, darning, and button machines.

File No		Hrs	Clas	Type of Instruction
FR-D-1-PFS	Introduction to Clothing and Textile Repair Sewing Machines			
Hours		1	U	.6TV, .4PE1
Objective:	Choose the machine in relationship to the material to be sewn; locate, by name, the operator's controls of the light duty, darning, and button sewing machines.			
Ref:	Parts 1 & 2, TM 10-3530-203-10 Sec XII, QMS 200.W1, Part I; VT 760-101-00808, Introduction to Textile Repair Sewing Machines; QMS 200.9			
FR-D-2-PFS	Perform Operator's Maintenance of Clothing and Textile Sewing Machines; Maintenance Forms			
Hours		2	U	.5PI, 1.5PE1
Objective:	Perform operator's preventive maintenance services, and use DA Form 2404 in performing operator's maintenance on sewing machines.			
Ref:	Chap 3 and Chap 6, TM 10-3530-203-10; Para 3-4, TM 38-750; Sections XIII, XVII, and XXVI, QMS 200.W1, Part I; QMS 200.10			
FR-D-3-PFS	Preparation for Operation of the Light Duty Sewing Machine			
Hours		2	U	.5PI, 1.5PE1

Section IV

File No — Hrs — Clas — Type of Instruction

Objective: Prepare the light duty sewing machine for operation.

Ref: Chap 2, TM 10-3530-203-10;
Sec XIV, QMS 200.W1, Part I;
QMS 200.11

FR-D-4-PFS Adjustment and Operation of the Light Duty Sewing Machine

Hours 2 U .3PI, 1.7PE1

Objective: Operate and adjust the light duty sewing machine.

Ref: Chap 2, TM 10-3530-203-10; Sec XV, QMS 200.W1, Part I;
QMS 200.12

FR-D-5-PFS Cleaning Shuttle Race Assembly Light Duty Sewing Machine

Hours 1 U .2TV, .8PE1

Objective: Remove, disassemble, clean, lubricate, reassemble and replace the shuttle race assembly.

Ref: Chap 3, TM 10-3530-203-10; Sec XVII, QMS 200.W1, Part 1;
VT 760-101-0164B, Shuttle Race Assembly; QMS 200.13

FR-D-6-PFS Light Duty Sewing Machine Examination

Hours 2 U 2E2

Objective: Demonstrate ability to prepare machine for operation, perform operator's maintenance, and make all operator's adjustments.

Ref: None

Section IV

File No		Hrs	Clas	Type of Instruction
FR-D-7-PFS	Preparation for Operation of the Darning Machine			
Hours		2	U	.7PI, 1.3PE1
Objective:	Prepare the darning machine for operation.			
Ref:	Chap 2, TM 10-3530-203-10; Sec XIX, QMS 200.W1, Part I; OMS 200.16			
FR-D-8-PFS	Adjustment and Operation of the Darning Machine			
Hours		2	U	.3PI, 1.7PE1
Objective:	Operate and adjust the darning machine.			
Ref:	Chap 2 and Chap 3, TM 10-3530-203-10; Sec XX, QMS 200.W1, Part I; OMS 200.17			
FR-D-9-PFS	Preparation for Operation of the Button Machine			
Hours		2	U	.7PI, 1.3PE1
Objective:	Prepare the button machine for operation.			
Ref:	Chap 5, TM 10-3530-203-10; Sec XXVII, QMS 200.W1, Part I; QMS 200.24			
FR-D-10-PFS	Adjustment and Operation of the Button Machine			
Hours		1	U	.3PI, .7PE1
Objective:	Operate and adjust the button machine.			
Ref:	Chap 5 and Chap 6, TM 10-3530-203-10; Sec XXVIII, QMS 200.W1, Part I; QMS 200.25			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-D-11-PFS	Detect and Correct Clothing and Textile Machine Malfunctions			
Hours		1	U	.5PI, .5PE1

Objective: Detect and correct malfunctions on clothing and textile machines.

Ref: Para 66-77, 78-86, and 184-191, TM 10-3530-203-10; Sec XVI, XXI, & XXIX, QMS 200.W1, Part I; QMS 200.26

Section IV

Annex E - Machine Sewing Clothing and Textile

Purpose - To provide the student with a knowledge of constructing basic seams, patches, repairs to clothing and textile items.

File No		Hrs	Clas	Type of Instruction
FR-E-1-PFS	Perform Simple~~s~~ Seam and Seam Type #1 Repairs			
Hours		4	U	.4TV, 3.6PE1
Objective:	Identify the characteristics of seams and stitching. Determine the use of and perform the Simple Seam and Seam Type #1 repairs. Distinguish between the face and underside of material. Match the grains of material.			
Ref:	Para 9, TM 10-267; Sec XXX, QMS 200.W1, Part II; VT 760-101-0216B, Simple Seam and Seam Type #1; VT 760-101-0349B, Shortening Legs of Cotton Trousers, QMS 200.27			
FR-E-2-PFS	Seam Type #2			
Hours		2	U	.2TV, 1.8PE1
Objective:	Perform Seam Type #2 repair.			
Ref:	Para 9, TM 10-267; Sec XXXI, QMS 200.W1, Part II; VT 760-101-0184B, Seam Type #2; QMS 200.28			
FR-E-3-PFS	Seam Type #3			
Hours		3	U	.2TV, 2.8PE1
Objective:	Perform Seam Type #3 repair.			
Ref:	Para 9, TM 10-267; Sec XXXII, QMS 200.W1, Part II; VT 760-101-0392B, Seam Type #3; QMS 200.29			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-E-4-PFS	Seam Type #4			
Hours		3	U	.2TV, 2.8PE1
Objective:	Perform Seam Type #4 repair.			
Ref:	Para 9, TM 10-267, Sec XXXIII; QMS 200.W1, Part II; VT 760-101-0186B,Seam Type #4; QMS 200.31			
FR-E-5-PFS	Simple and Seam Types #1, #2, #3, and #4 Examination			
Hours		3	U	3E2
Objective:	Demonstrate ability to perform the Simple Seam and Seam Types #1, #2, #3, and #4 repairs.			
Ref:	None			
FR-E-6-PFS	Perform Zig Zag and Reinforced Darn Repairs			
Hours		3	U	.3TV, 2.7PE1
Objective:	Perform Zig Zag and Reinforced Darn repairs.			
Ref:	Para 14, TM 10-267; Sec XXXVI, QMS 200.W1, Part II; VT 760-101-0191B,Zig Zag and Reinforced Darn;, QMS 200.35			
FR-E-7-PFS	Perform Simple Top and Inverted Patch Repairs			
Hours		4	U	.3TV, 3.7PE1
Objective:	Perform Simple Top and Inverted Patch repairs.			
Ref:	Para 13, TM 10-267; Sec XXXVII, QMS 200.W1, Part II; VT 760-101-0192B,Simple Top and Inverted Patch, QMS 200.36			

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Section IV

File No		Hrs	Clas	Type of Instruction
FR-E-8-PFS	Perform the T Patch Repairs			
Hours		3	U	.3TV, 2.7PE1
Objective:	Determine the use and construct the T Patch.			
Ref:	Para 13, TM 10-267; Sec XXXVIII, QMS 200.W1, Part II; VT 760-101-0393B, Construction of T Patch; QMS 200.37			
FR-E-9-PFS	Darns and Patches Examination			
Hours		3	U	3E2
Objective:	Demonstrate ability to perform Zig Zag Darns, Reinforced Darns, Simple Top and Inverted Patch repairs and "T" Patch repair			
Ref:	None			
FR-E-10-PFS	Repair Pocket Linings and Pockets of Trousers			
Hours		6	U	.4TV, 5.6PE1
Objective:	Repair damaged pocket linings on Khaki and/or wool trousers and repair damaged pockets on utility trousers.			
Ref:	Para 9, TM 10-267; Sec XLVIII, QMS 200.W1, Part II; VT 760-101-0165B, Replacing Trouser Pocket; QMS 200.47			
FR-E-11-PFS	Trouser Pocket Linings and Pocket Examination			
Hours		3	U	3E2
Objective:	Demonstrate ability to repair pocket linings and pockets on trousers.			
Ref:	None			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-E-12-PFS	Repair Zippers on Trousers			
Hours		6	U	.3TV, 5.7PE1
Objective:	Repair damaged zippers on trousers.			
Ref:	Para 12, TM 10-267; Sec IV, OMS 200.W1, Part II; VT 760-101-0217B, Repair Zippers on Trousers; OMS 200.57			
FR-E-13-PFS	Trouser Zipper Examination			
Hours		3	U	3E2
Objective:	Demonstrate ability to repair zippers on trousers.			
Ref:	None			

NOTE: PAGE 22 OF ORIGINAL POI DELETED DUE TO MILITARY SPECIFIC MATERIAL.

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Annex IV

Annex G - Clothing and Textile Shop Operations

Purpose - To provide the student with the knowledge necessary to set up and operate a Clothing and Textile Repair Shop and maintain maintenance forms and records used in a Clothing and Textile Repair Shop.

File No		Hrs	Clas	Type of Instruction
FR-G-1-PFS	Maintenance Records			
Hours		2	U	.7P1, 1.3PE1
Objective:	Fill out and maintain the maintenance forms, records and publications used in a Clothing and Textile Repair Shop.			
Ref:	Para 3-5 & 3-7, TM 38-750; Sec LIX, QMS 200.W1, Part II; QMS 222.5			
FR-G-2-PFS	Clothing and Textile Shop Operations			
Hours		12	U	1P1, 7PE1, 4E2
Objective:	Demonstrate ability to operate a Clothing and Textile Repair Shop.			
Ref:	All references in Annexes A, B, C, D, and E; FM 21-48, Planning and Conducting CBR and Nuclear Defense Training; FM 21-41, Soldier's Handbook for Defense Against Chemical and Biological Operations and Nuclear Warfare; QMS 200.60			

Section IV

Annex H - Nomenclature, Inspection, Hand Repairs to Canvas.

Purpose - To provide the student with a working knowledge of the duties and skills of a repairman needed in the inspection and nomenclature of hardware, canvas, webbing, and components of tentage; classification of tentage; folding tents; use of tools; construction and usage of handworked grommets; inserting metal grommet and snap fasteners in canvas and webbed items; chemically treating canvas; and methods of whipping, splicing, and tying knots and hitches to ropes.

File No		Hrs	Clas	Type of Instruction
FR-H-1-PFS	Nomenclature and Use of Canvas, Webbing, Hardware, and Tent Components			
Hours		1	U	1PI

Objective: Select and determine the use of the various types of canvas, webbing, and hardware. Locate by name parts on tentage.

Ref: TM 10-8340-211-13; Sec V, FM 10-16; Sec III, QMS 244.W1, Part I; QMS 244.2

FR-H-2-PFS	Inspection, Classification, and Folding Tents			
Hours		5	U	1PI, 4PE1

Objective: Inspect tentage, locate defects, and mark tentage using standard defect symbols. Classify tents using classification standards and symbols. Fold GP Medium Tent.

Ref: AR 32-15; Para 3 & 6, Chap 5, FM 10-16; Sec IV, QMS 244.W1, Part I; Para 4-9d, TM 10-8340-211-13; QMS 244.3

FR-H-3-PFS	Handworked Grommets			
Hours		2	U	.2TV, 1.8PE1

Objective: Determine the size in relation to use and construct the handworked grommet.

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Section IV

File No		Hrs	Clas	Type of Instruction
Ref:	Sec II, FM 10-16; Sec VIII, QMS 244.W1, Part I; VT 760-101-0283B, Handworked Grommets; QMS 244.7			
FR-H-4-PFS	Metal Grommets and Snap Fasteners			
Hours		2	U	.3TV, 1.7PE1
Objective:	Select the fastener/grommet in relation to use and install the various types of metal grommets and snap fasteners.			
Ref:	Sec II & III, FM 10-16; Sec IX, QMS 244.W1, Part I; VT 760-101-0282B, Metal Grommets and Snap Fasteners; QMS 244.8			
FR-H-5-PFS	Chemical Treatment of Canvas			
Hours		1	U	.1TV, .9PE1
Objective:	Chemically treat canvas and tentage to render it fire resistant, waterproof, and mildew resistant.			
Ref:	Chap 3, Para 14, FM 10-16; Sec XI, QMS 244.W1, Part I; VT 760-101-0287B, Chemical Treatment of Canvas; OMS 244.10			
FR-H-6-PFS	Whipping and Splicing Ropes; Knot Tying and Hitches			
Hours		11	U	.6TV, 10.4PE1
Objective:	Determine the use of each knot and hitch, and tie each; whip and splice ropes.			
Ref:	Chap 2, TM 5-725; Sec IV, FM 10-16; Sec XII, QMS 244.W1, Part I; VT 760-101-0284B, Whipping and Splicing Ropes, Knotting and Hitches; QMS 244.11			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-H-7-PFS	Hand Repairs Examination			
Hours		2	U	2E2

Objective: Demonstrate ability to construct a handworked grommet, splice a rope through the handworked grommet by means of an eye splice and whip the end of spliced rope.

Ref: None

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Section IV

Annex I - Canvas Repair Sewing Machines

Purpose - To provide the students with knowledge of operator maintenance, including adjustment, preparation for operation, troubleshooting, and operational tests of canvas repair sewing machines.

File No		Hrs	Clas	Type of Instruction
FR-I-1-PFS	Introduction to Canvas Sewing Machines			
Hours		1	U	.5TV, .5PE1
Objective:	Choose the machine model in relationship to the material to be sewn; locate by name the operator's controls of canvas and webbed equipage sewing machines (models: heavy duty, light duty, medium duty, and darner).			
Ref:	Para 6 thru 20; TM 10-3530-203-10; Sec XIII, QMS 244.W1, Part I; VT 760-101-0298B, Introduction to Sewing Machines; QMS 244.13			
FR-I-2-PFS	Operator Maintenance of Sewing Machines; Maintenance Forms			
Hours		2	U	.3TV, 1.7PE1
Objective:	Perform operator's preventive maintenance services, and use DA Form 2404 in performing operator's maintenance on canvas repair sewing machines.			
Ref:	Para 51 thru 56, TM 10-3530-203-10; Sec XIV, XIX, XXIII, and XXVIII, QMS 244.W1, Part I; VT 760-101-0295B, Operator Maintenance of Canvas Repair Sewing Machines; QMS 244.14			
FR-I-3-PFS	Preparation for Operation of Heavy Duty Machine, Model 7-33			
Hours		2	U	.5PI, 1.5PE1
Objective:	Prepare model heavy duty sewing machine for operation.			
Ref:	Para 29, TM 10-3530-203-10; Sec XV, QMS 244.W1, Part I; QMS 244.15			

Section IV

File No Hrs Clas Type of Instruction

FR-I-4-PFS Cleaning Shuttle Race Assembly, Heavy Duty Machine, Model 7-33

Hours 2 U .5P1, 1.5PE1

Objective: Disassemble, clean, oil, and reassemble shuttle race assembly of heavy duty sewing machine.

Ref: Para 53 and 54, TM 10-3530-203-10
Para 3-75; TM 10-3530-203-24
Sec XVI; QMS 244.W1, Part 1: QMS 244.16

FR-I-5-PFS Adjustment and Operation of Heavy Duty Machine, Model 7-33

Hours 2 U .3P1, 1.7PE1

Objective: Operate and adjust model heavy duty sewing machine.

Ref: Para 29-30, & 31, TM 10-3530-203-10;
Para 3-77, TM 10-3530-203-24;
Sec XVII, QMS 244.W1, Part 1; QMS 244.17

FR-I-6-PFS Troubleshooting Heavy Duty Machine, Model 7-33

Hours 1 U .3P1, .7PE1

Objective: Detect and correct malfunctions on model heavy duty sewing machines.

Ref: Para 87 thru 98, TM 10-3530-203-10;
Par 3-9, TM 10-3530-203-24;
Sec XVII, QMS 244.W1, Part 1; QMS 244.18

FR-I-7-PFS Heavy Duty Sewing Machine, Model 7-33, Examination

Hours 2 U 2E

Objective: Demonstrate ability to prepare machine for operation, perform maintenance, and make all operator's adjustments.

Ref: None

Section IV

File No		Hrs	Clas	Type of Instruction
FR-I-8-PFS	Preparation of Medium Duty Sewing Machine for Operation			
Hours		2	U	.5P1, 1.5PE1
Objective:	Prepare model medium duty sewing machine for operation.			
Ref:	Para 35, TM 10-3530-203-10; Sec XX, QMS 244.W1 Part I; QMS 244.20			
FR-I-9-PFS	Adjustment and Operation of Medium Duty Machine			
Hours		1	U	.3P1, .7PE1
Objective:	Operate and adjust model medium duty sewing machine.			
Ref:	Para 35 thru 37, TM 10-3530-203-10; Sec XXI, QMS 244.W1, Part 1; QMS 244.21			
FR-I-10-PFS	Detect and correct Medium Duty Machine malfunctions			
Hours		1	U	.3P1, .7PE1
Objective:	Detect and correct malfunctions on model medium duty sewing machines.			
Ref:	Para 116 thru 130, TM 10-3530-203-10; Sec XXII, QMS 244.W1, Part 1; QMS 244.22			
FR-I-11-PFS	Medium Duty Sewing Machine Examination			
Hours		2	U -	2E
Objective:	Demonstrate ability to prepare machine for operation, perform maintenance, and make all operator's adjustments.			
Ref:	None			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-I-12-PFS	Preparation of Heavy Duty Sewing Machines for Operation, Models 144W304 and 145W304			
Hours		4	U	.5PI, 3.5PE1
Objective:	Prepare sewing machines models 144W304 and 145W304 for operation.			
Ref:	TM-DGSC-3530-79 and 80; Sec XXXI, QMS 244.W1 Part I; QMS 244.51			
FR-I-13-PFS	Adjustment, Troubleshooting, and Operation of Heavy Duty Sewing Machines, Models 144W304 and 145W304			
Hours		4	U	.5P1, 3.5PE1
Objective:	Operate, troubleshoot, and adjust sewing machines, models 144W304 and 145W304.			
Ref:	TM-DGSC-3530-79 and 80; Sec XXXI, QMS 244.W1, Part I; QMS 244.52			
FR-I-14-PFS	Heavy Duty Sewing Machines Examination, Models 144W304 and 145W304			
Hours		4	U	4E2
Objective:	Demonstrate ability to prepare machines for operation, perform maintenance, and make all operator's adjustments.			
Ref:	None			

NOTE: ANNEX J & ANNEX K HAVE BEEN OMITTED DUE TO MILITARY SPECIFIC MATERIALS.

Section IV - Annexes (Cont)

Annex L - Canvas Repair Shop Operations

Purpose - To provide the student with the knowledge to set up and operate a Canvas Repair Shop; and to maintain maintenance forms and records used in a Canvas and Webbed Repair Shop.

File No	Hrs	Clas	Type of Instruction
FR-L-1-PFS Canvas and Webbed Repair Shop Operations and Examination			
Hours	14	U	1PI, 9PE1, 4E

Objective: Demonstrate ability to operate a Canvas and Webbed Equipment Repair Shop.

Ref: AR 32-15; FM 10-16; TM 10-3530-203-10; TM 10-3530-203-24; TM 10-8400-201-13; TM 38-750; QMS 244.W1, Parts I, II, and III; FM 21-48, Planning and Conducting CBR and Nuclear Defense Training; FM 21-41 Soldier's Handbook for Defense Against Chemical and Biological Operations and Nuclear Warfare: QMS 244.46

NOTE: ANNEX M HAS BEEN OMITTED DUE TO MILITARY SPECIFIC MATERIAL.

Section IV

Annex N - Ship's Store Operations (Tailoring)

Purpose - To provide the student with a knowledge of constructing basic seams, repairs and alterations to clothing and textile items.

File No		Hrs	Clas	Type of Instruction
FR-N-1-PFS	Seam Type #5			
Hours		3	U	.2TV, 2.8PE1
Objective:	Perform Seam Type #5 Repairs.			
Ref:	Para 9, TM 10-267; Sec XXXIV, QMS 200.W1, Part II; VT 760-101-0187B, Seam Type #5; OMS 200.32			
FR-N-2-PFS	Seam Type #6			
Hours		3	U	.2TV, 2.8PE1
Objective:	Perform Seam Type #6 Repairs.			
Ref:	Para 9, TM 10-267; Sec XXXV, QMS 200.W1, Part II; VT 760-101-0188B, Seam Type #6; OMS 200.33			
FR-N-3-PFS	Seam Types #5 and #6 Examination			
Hours		2	U	2E
Objective:	Demonstrate ability to perform seam types #5 and #6 repairs.			
Ref:	None			
FR-N-4-PFS	Construction of Basting, Felling, and Cross Stitches			
Hours		6	U	1P1, 5PE1
Objective:	Construct the three basic hand stitches.			
Ref:	Sec II, TM 10-267; Sec VIII, QMS 200.W1, Part I; QMS 200.7			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-N-5-PFS	Shortening Sleeves of Coats, Wool			
Hours		4	U	.3TV, 3.7PE1
Objective:	Shorten sleeves of wool coats.			
Ref:	AR 700-84; Para 7, TM 10-267, Sec LII, QMS 200.W1, Part II, VT 760-101-0220B, Shortening Coat Sleeves; QMS 200.53			
FR-N-6-PFS	Shortening Sleeves of Wool Coats Examination			
Hours		3	U	3E
Objective:	Demonstrate ability to shorten wool coat sleeves.			
Ref:	None			
FR-N-7-PFS	Sewing Insignia and Name Tapes			
Hours		8	U	.6TV, 7.4PE1
Objective:	Sew insignia and name tapes on shirts, jackets and coats.			
Ref:	AR 670-5, Sec LIV, QMS 200.W1, Part II, VT 760-101-0218B Sewing Insignia and Name Tapes; QMS 200.56			
FR-N-8-PFS	Shortening Legs of Cotton Trousers			
Hours		6	U	.4TV, 5.6PE1
Objective:	Shorten legs of cotton trousers.			
Ref:	AR 700-84, Para 9, TM 10-267, Sec XLI and XLII, QMS 200.W1, Part II, VT-760-101-0349B Shortening Legs of Cotton Trousers, QMS 200.41			

Section IV

File No		Hrs	Clas	Type of Instruction
FR-N-9-PFS	Lengthening and Shortening Legs of Wool Trousers			
Hours		8	U	.4TV, 7.6PE1
Objective:	Lengthen and shorten wool trouser legs.			
Ref:	AR 700-84; Para 7, TM 10-267; Sec XLIII and XLV, QMS 200.W1; Part II, VT 760-101-0337B Lengthening and Shortening Legs of Wool Trousers; QMS 200.43			
FR-N-10-PFS	Shortening Legs of Cotton and Wool Trousers Examination			
Hours		4	U	4E
Objective:	Demonstrate ability to shorten legs of cotton and wool trousers.			
Ref:	None			
FR-N-11-PFS	Waist and Crotch Alteration on Trousers			
Hours		16	U	.5TV, 15.5PE1
Objective:	Take in and let out the waist and crotch of trousers.			
Ref:	AR 700-84; Para 9, TM 10-267; Sec XLVI and XLVII, QMS 200.W1; Part II, VT 760-101-0338B, Waist and Crotch Alteration; QMS 200.45			
FR-N-12-PFS	Waist and Crotch Alteration Examination			
Hours		5	U	5E
Objective:	Demonstrate ability to let out waist and take in crotch of trousers.			
Ref:	None			

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NIPUB 352 (P4)

FABRIC REPAIRMAN

MOS: 43M10

PHASE II

68-HOURS

ANNEX H

NOMENCLATURE, INSPECTION, HAND REPAIRS TO CANVAS

ANNEX I

CANVAS REPAIR SEWING MACHINES

ANNEX L

CANVAS REPAIR SHOP OPERATIONS

(SUGGESTED SCHEDULE FOR INSTRUCTION)
FOR
(RESERVE COMPONENTS)

U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

SUPPLY TRAINING CENTER OF THE ARMY SCHOOL SYSTEM

ATSM-TNG-TM-ET
DECEMBER 1976

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QMS 244.2

U. S. ARMY QUARTERMASTER SCHOOL

LESSON PLAN

COURSE: Fabric Repair

ANNEX: H-1 Nomenclature, Inspection, Hand Repairs to Canvas

INSTRUCTIONAL UNIT: Nomenclature and Use of Canvas, Webbing, Hardware and Tent Components

TYPE: Programmed Instruction

TIME ALLOTTED: One (1) Hour

CLASS PRESENTED TO: Enlisted Personnel

TOOLS, EQUIPMENT AND MATERIAL: Components of Tentage, Samples of Various Types of Material used in the Repair of Tentage, QMS 244.2 PE1-1 Learning Performance Guide

PERSONNEL: One (1) per 18 students for Programmed Instruction

TRAINING AIDS: MCP Tent, Hardware, and material tagged with nomenclature, QMS 244.1WB-1, Part I

REFERENCES: TM 10-8340-211-13, Operator's Organizational and Direct Support Maintenance Manual, Sep 72, Section V; FM 10-16, General Repair of Tents, Canvas and Webbing, April 1974 Section III, QMS 244.1WB-1, Part I

STUDY ASSIGNMENTS: Recommended: Read Section III, QMS 244.1WB-1, Part I, Canvas and Webbed Equipage Repair Course, Jan 76.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring to class QMS 244.1WB-1, Canvas and Webbed Equipage Repair Course

TROOP REQUIREMENTS: None

TRANSPORTATION REQUIREMENTS: None

PROPONENT DEPARTMENT: Petroleum and Field Services

April 1976

THIS LESSON PLAN SUPERSEDES QMS 244.2 DATED OCTOBER 1974

1. INTRODUCTION (Conference, 2 minutes)

a. Objective. As a result of this instruction, the student given, learning performance guide and the various types of hardware, canvas, and webbing used by the Army, will be able to select and determine the use of the various types of canvas, webbing and hardware, and locate by name parts on Tentage, in accordance with standards prescribed in FM 10-16, General Repair of Tents, Canvas and Webbing, and QMS 244.1WB-1, Part I, Section III.

b. Reasons.

(1) As canvas and webbed repairman, it is important for you to have a thorough knowledge of the correct nomenclature and usage of hardware, found on canvas and webbed items. This knowledge is necessary for you as a canvas and webbed repairman to expedite time and avoid the misuse of hardware.

(2) When ordering supplies, the correct nomenclature must be used in order for the supply clerk to procure the items.

c. Review. One phase of your work will be pitching, striking and folding of tents. It is much easier to follow specific instructions in performing this job is the correct nomenclature is used and understood.

2. EXPLANATION/APPLICATION (Programmed Instruction, 45 minutes)

DIRECTIONS TO THE INSTRUCTOR FOR SELF-PACING

a. Have the following tools, equipment, supplies and materials available for students lesson:

(1) Various weights and types of canvas

(2) Various types and weights of webbing

(3) Various types of hardware used in tentage and webbed items

(4) QMS 244.2 PE1-1 Training Performance Guide

(5) QMS 244.1WB-1, Part I Student Workbook

(6) General Purpose Tent, Medium

b. Give student the QMS 244.2 PE1-1 and get student started on lesson.

c. Make sure student reads QMS 244.1WB-1, Part I, Section III.

d. Be alert to students having difficulty. Assist when necessary.

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e. Hoist tent up on pulley's

f. Have student identify the items and their use you have set out. Have him point out and name the various hardware on the tent.

3. REVIEW (Conference, 3 minutes)

When the student demonstrates that he can accomplish his objective, sign the progression sheet and advance him to the next block of instruction.

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U. S. ARMY QUARTERMASTER SCHOOL

LEARNING/PERFORMANCE GUIDE

COURSE: Fabric Repair

ANNEX: H-1 Nomenclature, Inspection, Hand Repairs to Canvas

INSTRUCTIONAL UNIT: Nomenclature and Use of Canvas, Webbing, Hardware and Tent Components

TYPE: Programmed Instruction

CLASS PRESENTED TO: Enlisted Personnel

TOOLS, EQUIPMENT AND MATERIAL: Components of Tentage, Samples of Various Types of Material used in the Repair of Tentage, QMS 244.2 PE1-1, Learning Performance Guide

TRAINING AIDS: GP Tent, Hardware and material tagged with Nomenclature, QMS 244.1WB-1, Part I

REFERENCES: TM 10-8340-211-13, Operator's Organizational and Direct Support Maintenance Manual, Sep 72, Section V; FM 10-16, General Repair of Tents, Canvas and Webbing, April 1974 Section III, QMS 244.1WB-1, Part I

STUDY ASSIGNMENTS: Recommended: Read Section III, QMS 244.1WB-1, Part I, Fabric Repair Course, Jan 76

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring to class QMS 244.1WB-1 Fabric Repair Course

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1976

LESSON TITLE: Nomenclature and Use of Canvas, Webbing, Hardware and Tent Components

Objective: As a result of this instruction, given learning performance guide and Sec III, QMS 244.1WB-1 and the various types of hardware, canvan, and webbing used by the Army, you will be able to select and determine the use of the various types of canvas, webbing and hardware, and locate by name parts on Tentage, in accordance with standards prescribed in FM 10-16, General Repair of Tents, Canvas and Webbing, and QMS 244.1 WB-1, Part I, Sec III.

Introduction: As canvas and webbed repairman, it is important for you to have a thorough knowledge of the correct nomenclature and usage of hardware, found on canvas and webbed items. This knowledge is necessary for you as a canvas and webbed repairman to expedite time and avoid the misuse of hardware. When ordering supplies, the correct nomenclature must be used in order for the supply clerk to procure the items. One phase of your work will be pitching, striking and folding of tents. It is much easier to follow specific instructions in performing this job if the correct nomenclature is used and understood.

Directions:

1. Read QMS 244.1WB-1, Fabric Repair Course, Part I, Section III, and Para 28, page 64, FM 10-16.

2. The instructor will have the various items laid out:

   a. Various weights and types of canvas.

   b. Various types and weights of webbing.

   c. Various types of hardware used on tentage and webbed items.

   d. A General Purpose Tent, (Medium), hoisted on pulleys.

3. After reading the material as stated above, and you feel you are ready, check with the instructor and he will have you identify, name, and describe the use of the various items of material and hardware, and point out and name the components on the tent.

4. The instructor will evaluate your work and if you accomplish the objective, he will sign your progression sheet and advance you to your next block of instruction.

SECTION III

NOMENCLATURE AND USAGE OF CANVAS, WEBBING, AND HARDWARE

I. Purpose and Scope.

This section provides instruction on the various types of hardware, canvas, and webbing used by the Army. It will enable you to correctly name the different pieces of hardware; locate and point out where they are applied on canvas, tentage and webbed equipage; describe and name the types of canvas used by the Army in the repair of tentage and webbed items, and name the component parts of tentage.

II. References.

TM 10-269

TM 20-15

III. Nomenclature and Usage.

A. Types of Canvas and Their Usage.

1. Duck, cotton, gray 8.25 ounces per square yard before waterproofing. This ducking is used for the fabrication of light weight tentage and equipage, also is water repellent and mildew resistant treated.

2. Duck, cotton 8.25 ounces per square yard OD-7. This ducking is also used for the fabrication of light weight tentage. Also it is fire, water, weather, and mildew resistant treated.

3. Duck, cotton, 9.68 ounces per square yard OD-7. This ducking is used for the fabrication of latrine screens, also is fire, water, weather, and mildew resistant (FWWMR).

4. Duck, cotton, 9.85 ounces per square yard OD-7. This ducking is used for the fabrication of equipage items, such as field packs and first aid pouches. It is water repellent and mildew resistant treated.

5. Duck, cotton, 12.29 ounces per square yard OD-7. This ducking is used for the fabrication of heavy weight tentage. It is water, fire, weather, and mildew resistant treated.

6. Duck, cotton, 16 ounces per square yard. This ducking is vinyl coated and of light green color. It is used as covering of frame type tentage, also is fire and mildew resistant treated.

B. Types of Webbing and Its Usage. Few of the articles of equipage where webbing is found are field packs, first aid pouches, rifle slings and pistol belts.

1. Light Weight Webbing - Ranges from 1/4 inch to 1 1/2 inches in width, in hard and soft textures and OD and white in color.

2. Medium Weight Webbing - Ranges from 1/2" to 2" in width, white and OD in color.

3. Heavy Weight Webbing - Ranges from 1/2" to 1 1/2" in width, white and OD in color.

4. Special Webbing - Is 2 1/2" wide and is used for rifle belts and pistol belts. It is of hard texture.

C. Types of Hardware and Their Use.

1. Tent Slips - Are devices used to adjust eave lines, which are components of the tent.

2. Fair Leader - Aluminum block castings 5 1/2" by 1 1/2" and is used to keep eave lines from chafing the canvas at the tent eaves.

3. Triangle with Hook - A combination triangle and hook which is used to connect a fair leader to webbing that supports the tent.

4. S-Hooks - Is metal S-shaped hook. Used as a connecting link between the ridge plate and supporting ring on sectional tents.

5. Ridge Plates - Metal plates used with tentage to protect and support the fabric around the ridge pole spindles.

6. Squares - Square metal pieces used as a fastener to connect two pieces of webbing together (similar to buckle).

7. Grommets - They are metal rings used to reinforce a hole used for eave lines, guy lines, and footstops. There are two types of grommets, the hand sewn grommet and the grommet put on by a die and cutter.

8. Rings - Circular metal pieces are used as the tie tape fasteners, catches for snap hooks, and supports for hand-worked grommets.

9. D-Rings - Metal D-shaped rings are used on canvas equipage to catch snap hooks and on tentage to loop over pole spindles.

10. Snap Fasteners - Are used on all types of covers, cases, boxes, and pouches in order to fasten or secure the opening. There are two (2) types of snap fasteners.

a. Snap Fastener, Style 1.

b. Snap Fastener, Style 2.

11. Buckles - Are metal fasteners, used for various type straps and belts on equipment.

12. Tips - Are metal constructed, are used on the ends of webbing to keep it from fraying.

D. Components of Tentage.

1. Chapes - Are canvas or webbing loops used to hold hardware, such as buckles and rings to canvas equipage and tentage.

2. Corner Straps - Are straps which secure the "D" ring or a triangle to the corner of the tent. The corner strap and ring are used to hold each corner of the tent out.

3. Door Flaps - Are the part of the tent which form the covering to the entrance.

4. Eaves - Are an extension of the edge of the roof beyond the wall of the tents.

NOTE: Eaves are not on the General Purpose Tents.

5. Eave Lines - Are the supporting lines that extend from the eave of a tent to the pin which is driven in the ground.

6. Foot Stops - Are rope loops at the bottom of the wall of a tent, which is fastened to a tent pin.

7. Guy Lines - Are used to hold the tent upright poles in a steady position, and additional security during inclement weather.

8. Lacing Lines - Are ropes used to lace (join) the side walls or any two sections together.

9. Pins - Are wooden or metal constructed, used as anchors for corners, eave, guy lines, or foot stops. There are five (5) types of pins. They are as follows:

a. 16 inch pin - This pin has one notch and is used on the foot stop.

b. 24 inch pin - This pin has two notches and is used for eave lines and guy lines.

c. 9 inch aluminum pin - This pin is used under cold weather conditions when hard ground conditions prevail.

d. 12 inch steel pins - This pin is also used under the same conditions as the aluminum pin.

e. 36 inch pin - This pin does not have notches. It is used for eave and guy lines on the assembly tent.

10. Ridge - Is the peak of the tent that extends between the center poles.

11. Side Walls - Is the part of a tent extending from below the eaves to the ground on all sides of a tent.

12. Sod Cloth - A strip of canvas sewn into the hem at the bottom of the side wall, it is used for insulating purposes.

13. Door Screen - A screen is attached on the inside to each side of each door entrance. When in use, the door screens are pulled across the door entrances and secured in place by tying tie tapes at the top of the screens to metal rings at the eave above the door entrances.

14. Windows - Each window assembly consists of a plastic window screen, a vinyl plastic window pane, and a canvas blackout flap.

15. Tent Cover - The tent is provided with a cover for use when it is in storage or is being transported.

16. Instruction Panels - On the General Purpose Tents, there are two (2) panels with a canvas flap cover. They are located on each side of the door opening on the tent. These instructions are on the pitching, striking, and folding of the tent. The other panel explains the care and storage of the tent.

17. Door Poles - Are used for the two entrances to the tent. On the General Purpose Tent they are 6 feet 2 inches long.

18. Eave Poles - Are used to support the eaves of the tent. They are 5 feet 8 inches long on the General Purpose Tent.

19. Center Poles - Are used to support the ridge pole. They are 10 feet 3 inches long and come in two sections.

20. Toggles - Wooden pins used to secure the tent doors.

21. Toggles Loops - Cords or ropes to which the toggles are attached to secure the doors of tent.

22. Loops - Rope or webbed material attached to tent to use as tie down.

23. Cables - Wire ropes to hold the tent door.

24. Buckle Lacing - Webbing used to tie down the sides or wall of a tent.

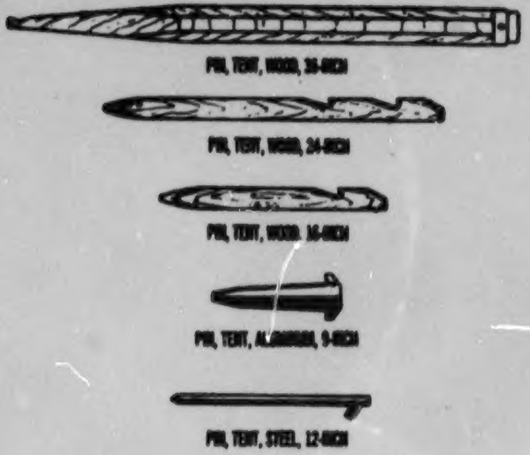
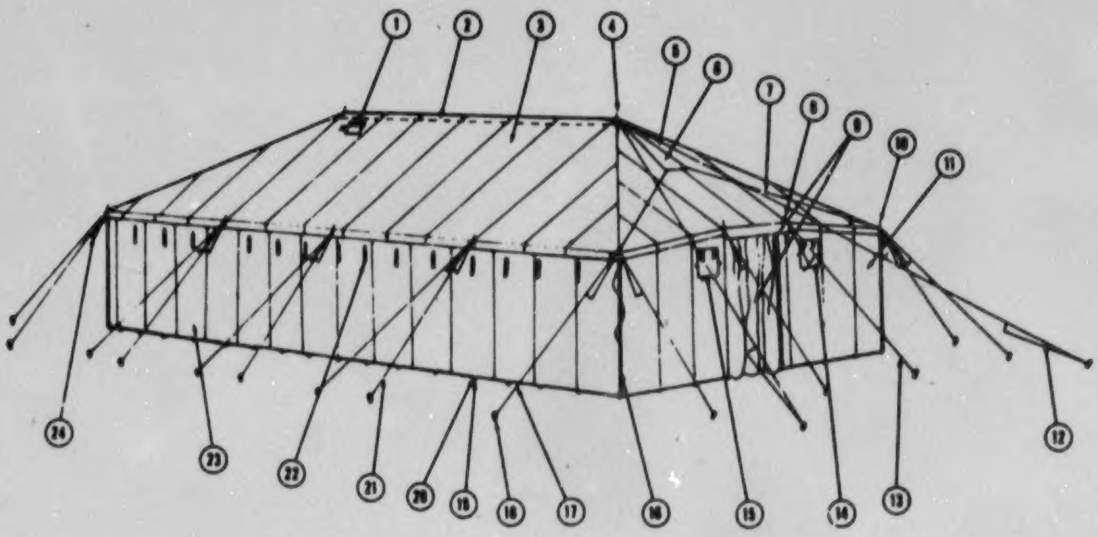

PIN, TENT, WOOD, 36-INCH
PIN, TENT, WOOD, 24-INCH
PIN, TENT, WOOD, 16-INCH
PIN, TENT, ALUMINUM, 9-INCH
PIN, TENT, STEEL, 12-INCH

Figure 1. *Tent pins.*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1 Stovepipe opening
2 Ridge pole
3 Side roof
4 Center pole
5 End roof
6 Ventilator
7 Ventilator flap line
8 Door pole
9 Door curtain
10 Eave pole
11 End wall
12 Ridge guy line
13 Door eave line
14 Care and maintenance instructions flap
15 Erection instructions flap
16 Slide fastener
17 Corner eave line
18 24-inch wood tent pin, or 12-inch steel tent pin
19 Footstop
20 16-inch wood tent pin, or 9-inch aluminum tent pin
21 Side eave line
22 Tie tape
23 Sidewall
24 Tent slip

Figure 1a.*Tent, general purpose, medium.*

U. S. ARMY QUARTERMASTER SCHOOL

LESSON PLAN

COURSE: Fabric Repair

ANNEX: H-2 Nomenclature, Inspection, Hand Repairs to Canvas

INSTRUCTIONAL UNIT: Inspection, Classification, and Folding Tents

TYPE: Programmed Instruction, Practical Exercise 1

TIME ALLOTTED: Five Hours

CLASSES PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: GP Medium Tent, Chalk, Salvage Material (Canvas), QMS 244.3 PE1-1, Learning Performance Guide

PERSONNEL: One (1) Instructor per five (5) students for Practical Exercise 1 and one (1) per eighteen (18) for Programmed Instruction.

TRAINING AIDS: 1GP Tent, Chalk, Salvage Material (Canvas) Coding Chart (14023-67-1H-1), QMS 244.1WB-1, Part I, Sec IV.

REFERENCES: AR 32-15, Classification and Inspection, April 65; FM 10-16, General Repair of Tents, Canvas, and Webbing, April 74, Para 3 & 6 and Chap 5; Section IV, QMS 244.1WB-1, Part I, TM 10-8340-211-13, Maintenance Manual, Tent, General Purpose, Sep 72, Para 4-9d, page 4-21 - 4-22.

STUDY ASSIGNMENTS: Recommended: Read QMS 244.1WB-1, Canvas and Webbed Repair, Part I, Jan 76, Section IV, Pages 4.01 - 4.14.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.1WB-1, Canvas and Webbed Repair, Part I, Jan 76.

TROOP REQUIREMENTS: None

TRANSPORTATION REQUIREMENTS: None

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1976

THIS LESSON PLAN SUPERSEDES QMS 244.3 DATED OCTOBER 1974

1. INTRODUCTION (Conference, 2 minutes)

a. Objective. As a result of this instruction, the student, given QMS 244.3 PE1-1 and QMS 244.1WB-1, Part 1, chalk, defect marking guide, and damaged tentage, will be able to inspect tentage, locate defects, and mark tentage using standard defect symbols, classify tents using classification standards and symbols, and fold GP Medium Tent in accordance with AR 32-15; FM 10-16, Para 3 & 6 and Chap 5; QMS 244.1WB-1, Part 1, Sec IV; and TM 10-8340-211-13, Para 4-9d, Page 4-21 - 4-22.

b. Reasons. As Fabric Repairman, it is important for you to know the proper procedures for inspection, marking, and classification of tentage. This procedure will also eliminate possible guesswork, and it insures a smooth flow of work, as everyone will know exactly what repairs need to be done. By knowing the proper marking symbols, it will speed up repairs because the symbol used will indicate what type of repair is required. Also, it will govern the quality of good tentage repaired as the classification standards govern the state an item must be in to be reissued. Upon completion of this lesson, you will be called upon to inspect, mark, and classify tentage. The knowledge gained here will provide you with the skills that will be required to perform your mission as Fabric Repairmen.

c. Review. During the past hour, you were instructed in the nomenclature and use of the various types of canvas and webbed items. You found that tentage and canvas items are made up of several components. This period of instruction is devoted to inspection, marking, and classification of tentage. This is equally important in that these procedures also prolong the life of tentage. It is required that the components discussed will be inspected periodically.

2. EXPLANATION/APPLICATION (Programmed Instruction, 50 minutes, PE1, 195 minutes)

DIRECTIONS TO THE INSTRUCTOR FOR SELF-PACING

a. Have the following tools, equipment, supplies and materials available for students lesson:

(1) Chalk

(2) Defect marking guide

(3) Damaged tent hoisted on pulleys (GP Medium)

(4) QMS 244.3 PE1-1 Learning Performance Guide

(5) QMS 244.1WB-1, Part 1 - Student workbook

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b. Give student QMS 244.3 PE1-1 and get student started on lesson.

c. Make sure student reads QMS 244.1WB-1, Part I, Section IV.

d. Be alert to students having difficulty. Assist when necessary.

e. When student is ready for his practical exercise, have student perform the following:

(1) Inspect Tent.

(2) Locate Defects.

(3) Mark defects using appropirate defect symbol.

(4) Classify tents using classification standards and symbols.

(5) Fold CP Tent Medium.

3. REVIEW (Conference, 3 minutes)

When the student has demonstrated that he can accomplish his objective, sign the progression sheet and advance him to the next block of instruction.

U. S. ARMY QUARTERMASTER SCHOOL

Learning Performance Guide

COURSE: Fabric Repair

ANNEX: H-2 Nomenclature, Inspection, Hand Repairs to Canvas

INSTRUCTIONAL UNIT: Inspection, Classification, and Folding Tents

TYPE: Programmed Instruction, Practical Exercise 1

CLASSES PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: GP Medium Tent, Chalk, Chalkboard, Salvage Material (Canvas) QMS 244.3 PE1-1, Learning Performance Guide

TRAINING AIDS: MGP, Tent, Chalk, Salvage Material (Canvas), Coding Chart (14023-67-1M-1), QMS 244.1WB-1, Part I, Sec IV

REFERENCES: AR 32-15, Classification and Inspection, April 65; FM 10-16, General Repair of Tents, Canvas, and Webbing, April 74, Para 3 & 6 and Chap 5; Section IV, QMS 244.1WB-1, Part 1; TM 10-8340-211-13, Maintenance Manual, Tent, General Purpose, Sep 72, Para 4-9d, page 4-21 - 4-22

STUDY ASSIGNMENTS: Recommended: Read QMS 244.1WB-1, Canvas and Webbed Repair, Part I, Jan 76, Section IV, Pages 4.01 - 4.14

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.1WB-1, Canvas and Webbed Repair, Part I, Jan 76

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1976

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LESSON TITLE: Inspection, Classification and Folding Tents

Your Objective: As a result of this instruction, given learning performance guide and QMS 244.1WB-1, Part 1, chalk, defect marking guide, and damaged tentage, you will be able to inspect tentage, locate defects, and mark tentage using standard defect symbols, classify tents using classification standards and symbols, and fold GP Medium Tent in accordance with AR 32-15; FM 10-16, Para 3 & 6 and Chap 5; QMS 244.1WB-1, Part 1, Sec IV; and TM 10-8340-211-13, Para 4-9d, Page 4-21 - 4-22.

Introduction: As Fabric Repairmen, it is important for you to know the proper procedures for inspection, marking, and classification of tentage. This procedure will also eliminate possible guesswork, and it insures a smooth flow of work, as everyone will know exactly what repairs need to be done. By knowing the proper marking symbols, it will speed up repairs because the symbol used will indicate what type of repair is required. Also, it will govern the quality of good tentage repaired as the classification standards govern the state an item must be in to be reissued. Upon completion of this lesson, you will be called upon to inspect, mark, and classify tentage. The knowledge gained here will provide you with the skills that will be required to perform your mission as Fabric Repairmen.

DIRECTIONS:

1. Read QMS 244.1WB-1, Part I, Sec IV.

2. The instructor will have the following available for your practical exercise:

   a. Chalk

   b. Defect marking guide

   c. Damaged GP Medium Tent hoisted on pulleys.

3. After reading the material as stated above and you feel you are ready, check with the instructor and he will start you on your practical exercise. If you have any difficulty while reading the material and do not understand the material, call on the instructor.

4. The instructor will have you perform the following:

   a. Inspect the tent in proper sequence.

   b. Locate all defects.

   c. Mark defects found with the appropriate defect marking symbol.

d. Classify the tent using the proper standards and symbols.

e. Fold the GP Medium Tent.

5. The instructor will evaluate your performance and if you accomplish your objective, he will sign your progression sheet and advance you to your next lesson.

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SECTION IV

INSPECTION AND CLASSIFICATION

PRACTICAL EXERCISE

I. Purpose and Scope.

This section provides instruction on the inspection and classification of tentage. It will enable you to inspect tentage systematically as outlined in TM 10-269, and locate all defects; using chalk, you will be able to mark each defect with the appropriate marking symbol; using given classification standards, you will be able to name and define each standard; using the tentage previously marked for defects, you will be able to mark each tent with the appropriate classification symbol as outlined in AR 32-15 and explain why the particular symbol was used.

II. References.

AR 32-15

TM 10-269

III. Inspection, Marking, and Classification Procedures.

A. Inspection Procedures (Equipage).

1. Method of Inspection - Use the following procedures to inspect equipage for repair.

a. Test and Tensile Strength of the Fabric. Before marking a piece of equipage for repair, test it by grasping a small fold of the fabric between the thumb and the forefinger of each hand, gripping it close up so that the tips of the forefingers touch. Tug the fabric several times; if it does not rip, it is repairable so far as its tensile strength is concerned.

CAUTION: When testing, always grasp the canvas or duck against the warp threads, which are the threads running parallel to the selvage. The woof (or cross threads) being weak, should not be used for testing the tensile strength.

b. Inspect Item for Damage. Handle systematically each piece of equipment being checked for repair. During the initial inspection of the item, mark the repairs to be made checking the surfaces in the following order:

(1) Top

(2) Bottom

(3) Left Side

(4) Right Side

(5) Front

(6) Back

(7) Inside

NOTE: If an item is composed of several parts, check each part separately, detaching the parts for inspection.

c. Give Item a Final Inspection - Upon completion of repairs, again check the item, paying special attention to the quality of the repair work to assure the following:

(1) The proper size of thread and length of stitch have been used and all breaks in stitching have been backstitched.

(2) The stitching has not, through carelessness, fastened parts together that should not be fastened together.

(3) Patches, straps, and replaced flaps correspond in color, texture, weight of material, and method of fastening to the original material and construction of the item being repaired.

(4) Chapes, billets, loops, and reinforcing strips are of the proper length and that they have been cross-stitched through the center and double-stitched at the end of the stitch area that takes the strain.

(5) Complementary hardware, such as snap fasteners, has been installed to assure perfect engagement without wrinkles or puckers.

(6) Mechanically set or die-inserted hardware, such as button, snap fasteners, grommets, end clips, and eyelets, have been securely clinched without damage to the surrounding fabric.

(7) All hardware is of the type and size specified and it is in working order.

(8) All detached parts have been checked for repair and properly attached to the item which they belong.

B. Inspection Procedures (Heavy Canvas and Tentage).

1. Method of Inspection - When inspecting heavy canvas or tentage for repair, use the following procedure:

a. Test the Tensile Strength of the Fabric - Before suspending heavy canvas or tentage for marking, test it by grasping a small fold of the fabric between the thumb and forefinger of each hand, gripping it close up so that the tips of the forefingers touch. Tug the fabric several times, if it does not rip, it is repairable so far as the tensile strength is concerned. If it tears on the first try, test several additional areas to ascertain the extent of the deterioration.

b. Inspect Tentage for Damage - To inspect tentage for damage draw up each tent by block and tackle and systematically check for defects. Have one man on the outside do the marking (para b) while another man on the inside points out or calls the repairs to be made. Raise the tent a few feet at a time and check the various parts in the following order:

(1) Peak, or part attached to block and tackle.

(2) Roof

(3) Eaves

(4) Side Walls

(5) Sod Cloth

(6) Lines

(7) Windows

(8) Screens

(9) Stovepipe openings

NOTE: Check separately such parts as covers, curtains, sashes, ground cloths, and vestibules.

c. Essential Points for Inspection - When inspecting heavy canvas or tentage, use the following check list for guidance:

(1) Fabric

- (a) Tensile Strength
- (b) Abrasions
- (c) Holes
- (d) Mildew
- (e) Patches
- (f) Previous Repair Work
- (g) Seams
- (h) Spots and Stains
- (i) Stitching
- (j) Tears or Rips

(2) Webbing Parts

- (a) Chapes
- (b) Lines
- (c) Reinforcements
- (d) Straps
- (e) Tapes

(3) Hardware

- (a) Blocks and Tackle
- (b) Bull's Eyes
- (c) Chains, with Plates
- (d) Chains, with Supporting Rings
- (e) End Clips
- (f) End Hooks
- (g) Eyelets, with Washers
- (h) Fair-leaders

- (i) Fasteners
- (j) Grommets, with Washers
- (k) Loops
- (l) Plates
- (m) Rings
- (n) D-Rings
- (o) Rivets
- (p) S-Hooks
- (q) Snaps
- (r) Thimble
- (s) Triangles
- (t) Triangles, with Hooks
- (u) Wall D-Rings

(4) Lines

- (a) Cover
- (b) Door
- (c) Draw
- (d) Eave
- (e) Footstop
- (f) Guy
- (g) Hoisting
- (h) Hood
- (i) Jumper
- (j) Lacing
- (k) Liner-hoistening

(l) Tie

(m) Ventilator-flap

(n) Water-flap

C. Standards of Repair. The following standards will govern the repair of heavy canvas or tentage.

1. General Appearance.

a. Faded tent duck is acceptable provided the fading is the only defect.

b. Nondeteriorating spots and stains caused by mildew, sap, and dirt are acceptable provided the fabric has been brushed clean. Where the fabric has been weakened by the staining agent, it must be repaired.

2. Material.

a. Khaki duck or duck not resistant treated for fire, water, weather, and mildew is not acceptable and should not be repaired.

b. Fabric (other than khaki duck) containing holes, tears, badly worn areas, weak spots, and frayed sections must be repaired.

c. Spotted and stained fabric showing deterioration when thumb-tested must be repaired.

d. A badly damaged section or one containing a large number of patches must be replaced with a new section similar to that used in the original construction.

e. Previous repair work of substandard quality is a defect and must be properly repaired.

3. Stitching and Seams.

a. Breaks and run-offs of stitching must be repaired.

b. Seams in which the thread has rotted must be restitched.

4. Hardware.

a. All hardware that is rusty, corroded, bent, broken, or otherwise defective must be replaced.

b. Hardware having an electro-zinc-plate finish must be replaced with hardware having a heavy hot-galvanized finish.

NOTE: Electro-zinc-plated hardware has a dull flaky finish, whereas hot-galvanize finished hardware has a bright, smooth, irregular finish.

5. Webbing - All defective tie tapes, wall lines, ring and snap chapes, corner straps, and web reinforcements must be replaced, being stitched in the same manner as in the original construction.

6. Lines.

a. Frayed or raveled ends must be hand whipped or machine stitched.

b. Lines with frayed or broken strands must be replaced, serviceable lines taken from unserviceable items being acceptable for this purpose.

7. Other Repairs.

a. When a ventilator opening has more than two patches or defects, replace the entire ventilator section.

b. A ventilator cover containing more than two defects or patches must be replaced with a serviceable cover.

c. A blackout flap not forming a good closure must be detached and replaced.

d. An extension cloth causing the tent to wrinkle must be replaced.

e. A ventilator duct with a hole, tear, or rip may be patched with either a sewed patch or cement patch.

f. A window flap of improper dimensions must be replaced with a serviceable flap of proper dimensions.

g. A window framework assembly may be patched provided the patching does not distort the window opening.

h. A window sash made of cellulose acetate and cotton netting must be replaced with a flexible waterproof film sash.

i. An outlet sash may be patched or repaired provided the proper size is maintained and the number of patches does not exceed three.

j. An excessively stretched rope reinforcement may be repaired by being shortened and then restitched in the manner of the original construction, or it may be replaced with a new rope.

D. Final Inspection. Upon completion of repairs, again check the tentage, paying special attention to the quality of the repair work and make sure of the following:

1. The proper size of thread and length of stitch have been

used and all breaks in the stitching backstitched.

2. The stitching has not, through carelessness, fastened together parts that should not be fastened together.

3. Patches and replaced parts correspond in color, texture, weight of material, and method of fastening, to the original material and construction of tent being repaired.

4. Chapes, loops, and reinforcing strips are of the proper width and length and that they have been properly stitched.

5. Complementary hardware, such as snap fasteners, has been installed to assure perfect engagement without wrinkling or puckering the fabric.

6. Die inserted hardware, such as snap fasteners and grommets, has been securely clinched without damage to the surrounding fabric.

7. All hardware is of the type and size specified and that it is in working order.

8. All detached parts, such as curtain liners and sashes, have been checked for repair and are properly attached to the tent with which they belong.

E. Marking Symbols Used on Tentage. Symbols are used to speed up production and keep a steady flow of work. If the inspectors of the items mark the correct symbols for the repairs, the operator of the machines does not have to re-inspect the item to find out what repairs are necessary. Therefore, it is necessary for everyone to know the marking symbols below by heart.

1. ○ Circle - A circle denotes that a minor repair has to be made. It could be darning, tacking, or the use of a cement patch on an area where the damage is less than 4 3/4 of an inch.

2. ▭ Rectangle or Square - Indicates that a hand or machine sewn patch is needed. A hand or machine sewn patch is used when the area of damage is over 4 3/4 of an inch.

3. ⟶ Arrow - Indicates a hidden damage such as under the eave or sod cloth, also denotes missing hardware such as grommets and tent slips.

4. || Parallel Lines - Indicates an open seam. A line is chalked along each side of the open seam parallel to the seam and extending the distance to be sewn.

5. + Cross - Indicates damage or missing part is on the inside, an old patch must be replaced, and a section or panel must be replaced.

6. W. P. Symbol for Waterproofing is WP. It is placed right over the doors.

7. (Mildew) Symbol for Mildew - Mildew is written out with a circle drawn around it. This is used in the area of the mildew on the tent.

F. Classification.

1. Each post, camp and station has a classification officer responsible for classifying equipment. He and his assistants are the only personnel who can classify tentage and webbed items. Tentage and webbed items are classified before repair in order to determine

whether it should be repaired or salvaged, also they are classified after repair to make sure that it possesses serviceability and appearance necessary for re-issue.

a. For classification and repair of tentage and webbed items, AR 32-15 will be used as a guide in the field.

b. Since only the classification officer and his assistants can classify canvas items, you probably wonder why you are learning about classification. When the Fabric and Leather Repair Section of each Direct Support or General Support Bns are operating in the field, it is their responsibility to classify all canvas and webbing items brought for repairs. You may at one time or another, be the individual assigned to this job, under the supervision of the classification officer.

2. The following are the definition and standards, which governs the classification of tentage and webbed items.

a. Class A - New and unused property possessing original appearance and serviceability.

b. Class B - Serviceable property of such appearance and serviceability as to be acceptable for issue or sale in lieu of like Class A (new) property.

c. Class F - Unserviceable items which are economically repairable. Economically repairable items are those items which may be restored to class "B" condition for not more than 35 percent (clothing) or 65 percent (equipage) or prices contained in current Department of Defense Federal Supply Catalog Management Data Lists.

d. Class H - Unserviceable items which are obviously scrap or salvage, or for which any use would require a repair cost exceeding 35 percent for clothing or 65 percent for equipage of the current cost of the item.

e. Class X - Items which do not possess the appearance or degree of serviceability to justify the classification of "B" or which cannot be repaired economically for the purpose originally intended, but which can be used as an end item for duties which are harmful to clothing, i.e., mechanics, painters, construction workers, etc.

G. Folding the Tent.

1. Fold each tent in accordance with FM 20-15.

2. Spread the tent out flat, with the outside facing up, making sure that all wrinkles are removed. Secure the doors, stove pipe openings, ventilator flaps and windows.

3. Place all eave lines toward the center of the tent and then fold end walls toward center of the tent at eave line.

NOTE: If folding in a dirt area, sweep the tent after each fold.

4. Fold side walls toward center of tent, along eave lines. The tent now should be square, with all wrinkles pulled out.

5. Fold both ends toward center of tent, making six (6) foot folds. Fold one end of folded tent over the other.

6. Fold each end of folded tent toward center, making three (3) foot folds, and overlap one end over the other.

NOTE: If the tent has a tent cover, place the folded tent in the center of cover and close cover securely.

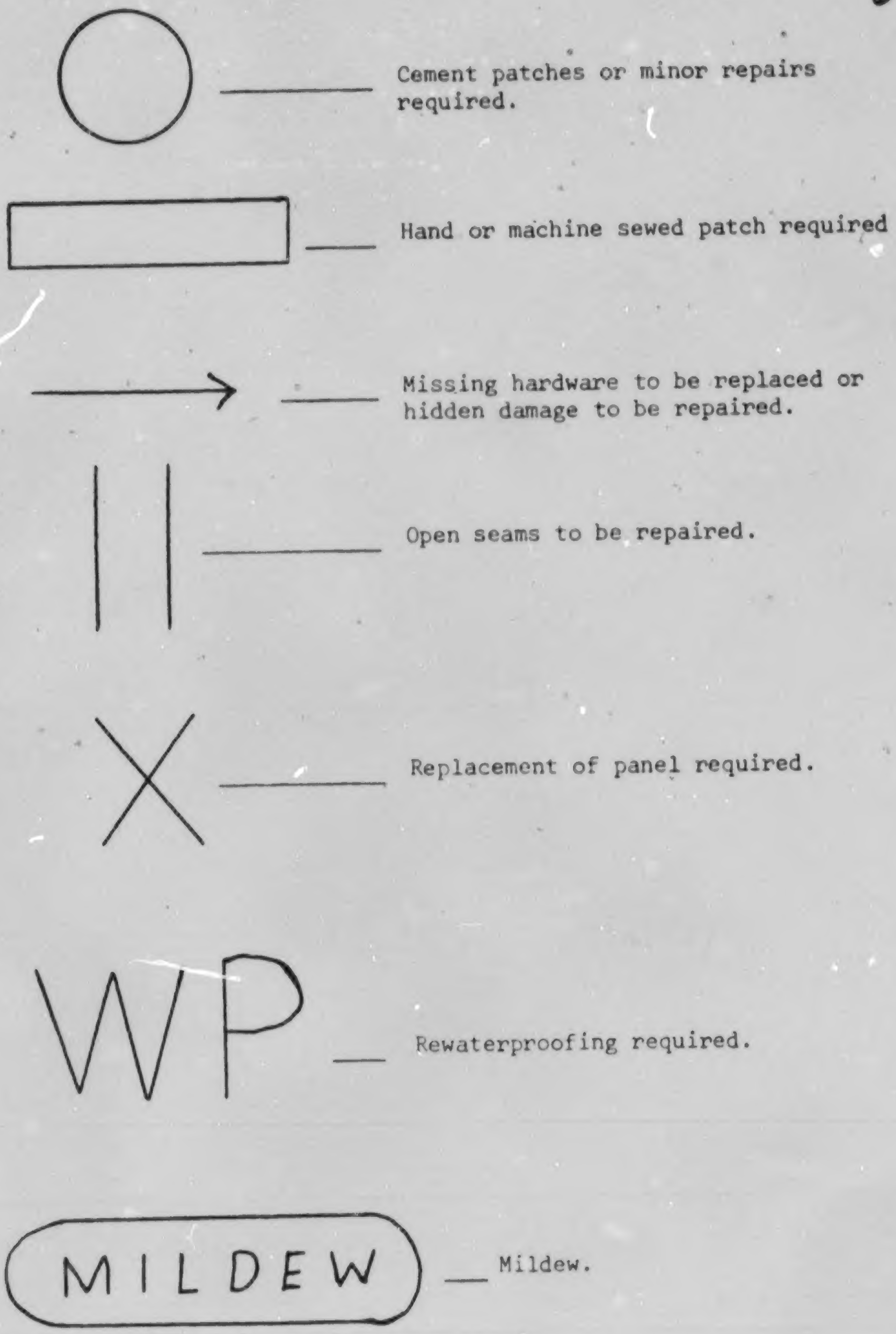
Cement patches or minor repairs required.
Hand or machine sewed patch required
Missing hardware to be replaced or hidden damage to be repaired.
Open seams to be repaired.
Replacement of panel required.
WP
Rewaterproofing required.
MILDEW
Mildew.

Figure 2. Symbols used in marking tentage for repairs.

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QMS 244.7 L/PG

U. S. ARMY QUARTERMASTER SCHOOL

Learning Performance Guide

COURSE: Canvas and Webbed Equipage Repair

ANNEX: B-3 Nomenclature, Inspection, Hand Repair Operations.

INSTRUCTIONAL UNIT: **Handworked Grommet**

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Sewing Palm, Wax, Cord, Salvage Canvas, Needle, Iron Ring, Cutters, Lead Block, Video Tape Cassette Player Set, and Student Learning Performance Guide QMS 244.7 L/PG.

TYPE: Television and Practical Exercise

TRAINING AIDS: Salvage Canvas Materials, Cassette Tape VT 760-101-0283B, and Student Learning Performance Guide QMS 244.7 L/PG.

REFERENCES: FM 10-16, Canvas and Webbing, April 1974, Sec II; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section VIII; and Cassette Tape VT 760-101-0283B.

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section VIII, Pgs 8.01 - 8.07.

STUDENT UNIFORM AND EQUIPMENT: Wear fatigues and bring to class all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

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LESSON TITLE: Handworked Grommet

YOUR OBJECTIVE: As a result of this instruction, given references, Sewing Palm, Wax, Cord, Salvage Canvas, Needle, Iron Rings, Cutters, Lead Block, Video Cassette Player Set, and Student Learning Performance Guide, you will be able to determine size in relation to use and construct the handworked grommet in accordance with standards prescribed in FM 10-16, Section II, Chapter 18, pgs 44 - 48.

INTRODUCTION: As a Canvas and Webbed Equipage Repairman, you will often be required to install a hand sewn grommet. Hand sewn grommets are stronger than die inserted grommets and can be installed while the tent is still erected. This in the long run will save time as it would require time to strike the tent and install a die inserted grommet. In addition, the user not only loses the use of the tent while it is being repaired, but a new storage site must be found to house those materials previously stored under the tent.

DIRECTIONS.

1. The instructor will issue to you the following listed items:

   a. Sewing Palm.

   b. Video tape cassette player set and cartridge #VT 760-101-0238B, Hand Sewn Grommets. (Enter the date and time you checked out the cartridge on your student progression sheet).

   c. Wax.

   d. Salvage Canvas.

   e. Needle.

   f. Iron Ring.

   g. Cutters.

   h. Cord. (Cotton size 10-4)

   i. Lead Block.

   j. QMS 244.W1, Part I (student workbook).

2. Insert the cassette tape, and watch the tape until the stop direction appears. At this point, stop the tape, and perform as directed in the film.

3. Continue at your own pace until all stops are watched and performed as directed. If you have problems understanding procedures, replay the tape over again.

4. Your classroom instructor will give assistance if required. Raise your hand to avoid distracting other students that may be watching tapes when help from the instructor is required.

5. Ask your classroom instructor to check and evaluate your work.

6. The instructor must sign your student progression sheet before you may go on to the next lesson.

SECTION VIII

HANDWORKED GROMMETS

PRACTICAL EXERCISE

I. Purpose and Scope.

The instructions in this section describe the use of the handworked grommet, name the the three sizes of iron rings used to make handworked grommets, and give the correct number of round stitches used to stitch each size of ring. Using appropriate tools, supplies, deviation standards and pieces of material, you will be able to construct a handworked grommet in such a manner that the hole, number of stitches, and workmanship meets the minimal deviation standards established for each size ring. Handsewn grommets are used to reinforce and protect the fabric at all points where the grommet hole has been made (example: ropes, lines, spindles, and/or sometimes webbing straps). As you recall, you learned how to handsew a patch to a piece of salvaged canvas and you found it to be stronger than a patch sewn by machine. The same is true for the handsewn grommet to tentage. The advantage of the handsewn grommet is that it can be applied while the tent is erected, thereby saving time, and preventing you from having to strike or take down the tent.

II. References.

TM 10-269

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III. Tools, Supplies and Equipment Required.

Sailmaker's needle #15
Sailmaker's palm
Sewing cord
Beeswax
Cutter
Lead block
Rawhide mallet
Shears
Grommet ring
Material

IV. Performance Standards. Performance standards are set up so you can check your work and determine how well you are learning the required skills.

A. Was Correct Procedure Applied in Starting and Ending the Stitches?

B. Were Stitches Spaced Evenly? (1/8 inch apart)

C. Were the Correct Number of Stitches Used? (18 stitches for 3/4 inch ring)

D. Was the Proper Cutter Used? (#4 for 3/4 inch ring)

E. See Paragraph V, B and C for checking all sizes of grommets and stitches.

V. Procedures for Hand Sewing Grommets.

A. Definition. A handworked grommet is an iron ring handsewn to the grommet hole. As we said before this type grommet withstands great strain and is therefore commonly found on heavy tentage and tarps. Before attempting to resew a handworked grommet, make sure that the fabric surrounding the grommet hole is undamaged.

B. Sizes of Iron Grommets Used and the Number of Stitches Required for Each Size.

1. The iron ring grommets come in three (3) sizes, the largest being the one inch. This grommet requires twenty-two round stitches equally spaced around it. This size is usually found on large tents (assembly tents) or gun mount covers.

2. The medium size grommet is 3/4 inch in diameter and requires 18 round stitches equally spaced around it and used on general purpose tents and tarps.

3. The smallest grommet is 1/2 inch in diameter and requires 14 round stitches equally spaced around it and is usually found on small items of canvas.

C. Tools Used in Handsewing Grommets.

NOTE: These are the tools besides the palm, needle, and sissors.

1. Steel cutters are used to cut the hole in the canvas and must be the correct size for the grommet, for example, use the No. 4 cutter for the 1/2" and 3/4" iron rings and the No. 5 cutter for the 1 inch ring.

2. A lead block or a heavy wood block with sufficient end grain is placed under the canvas to provide a surface for cutting the grommet hole and to protect the cutter edge from being damaged.

CAUTION: Never use the cutter unless you place a lead block or wooden block under the tentage to be cut.

3. The rawhide mallet is used to drive the cutter, to provide a hole in the canvas for the grommet. Also, the rawhide mallet

will not mushroom the head of the cutter.

4. The wooden fid is used to make the stitches lay close to the handworked grommet; this also makes the stitches neater looking.

D. Handsewing the Grommet to a Piece of Salvage Material.

1. Prepare and wax a piece of cotton wrapping twine, 5 ply, 72 inches in length. Place the two ends together to form a piece 36 inches long. This 36 inches is a sufficient amount to sew the handworked grommet.

2. Thread a size 15 sailmaker's needle with the cord you just prepared and even the ends. Rewax the thread until the thread will stick to your fingers.

NOTE: You should have four strands running from the needle eye to the end, also the thread should be 18 inches long because it will take this amount to sew the grommet.

3. Place a 3/4 inch grommet on the canvas where it is to be sewn and mark around the outside and inside of the grommet.

NOTE: The inside mark is used to align the cutter and insure that the cutter edge will cut just inside the inside mark. The outside mark is used for the stitch line. Do not place the grommet too close to the edge of the material, but at least 1/2 inch from the edge.

4. Place the canvas over the lead block and make sure the lead block is centered under the cutting mark. Align a No. 4 cutter in the center of the inside mark and using the rawhide mallet, drive the cutter until it cuts a clean hole in the canvas.

5. Half the hole by using a rule to center the hole from top to bottom. Mark just beyond the top and bottom stitch line; now place the rule over the center of the hole from left to right and draw another mark. These marks should quarter the hole; using a pencil place a mark where the lines cross the stitch line from left to right.

6. After you have quartered the grommet hole, it must be marked so it will have four (4) stitch marks between each quarter, plus two marks placed where the line crosses the center on the left and right, giving you a total of 18 stitches spaced 1/8 inch apart.

7. Using the needle, make piercings into the canvas at each mark. Doing this, you will have uniform stitches around the grommet.

8. Center the iron ring over the grommet hole, so the ring will be sewn from the top side of the material.

9. Begin handworking the grommet by inserting the needle one-eighth inch from the outside edge of the ring and down into one of the piercings previously made. Then guide the needle up into the hole made by the cutter (center of grommet) and draw the thread through until a 1/2 inch end remains.

10. Lay the 1/2 inch end beside the ring facing in the direction to be sewn.

NOTE: The 1/2 inch end can be facing to the left or right as long as you sew in the same direction as the end runs.

11. Continue to sew by inserting the needle into each piercing (18 stitches) and guiding the needle up into the grommet center.

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NOTE: Make sure the end is secured by the round stitches and each stitch is equally spaced and drawn tight. Make sure you have 18 stitches.

12. Secure the end of the thread along the outer edge of the grommet ring by bringing the needle up through the grommet hole and inserting it under the last three stitches. Make sure you leave 1/2 inch end before you cut the cord.

13. To finish the handworked grommet, insert the wood fid into the grommet hole and turn the fid several times from both sides. This makes the thread even and smooth.

NOTE: The fid makes the stitches smooth and even.

STUDY QUESTIONS

1. List the number of stitches the following size grommets require:

   3/4 inch --

   1 inch --

   1/2 inch --

2. Which is stronger, the handworked grommet or the metal grommet?

3. What is a "fid" used for?

NOTE: ORIGINAL PAGE 42 HAS BEEN OMITTED; HOWEVER ALL MATERIAL HAS BEEN INCLUDED.

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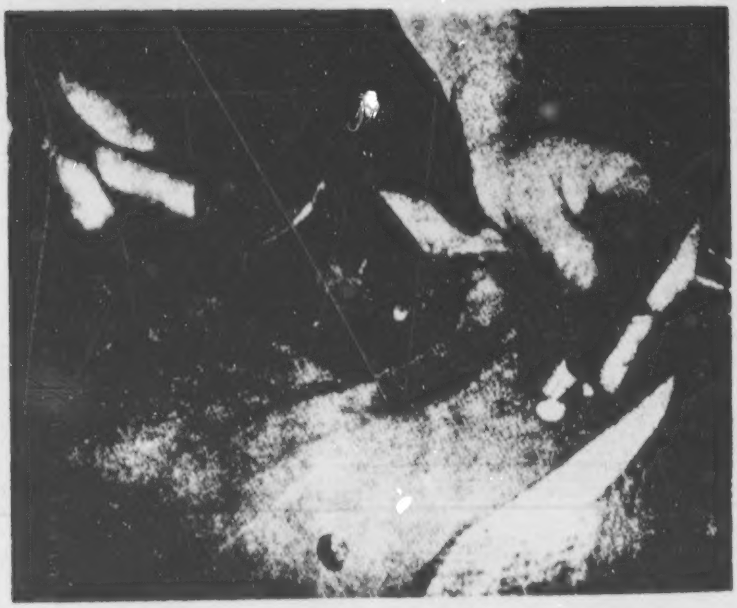

Figure 20 Hand-worked grommet, showing grommet hole being cut.

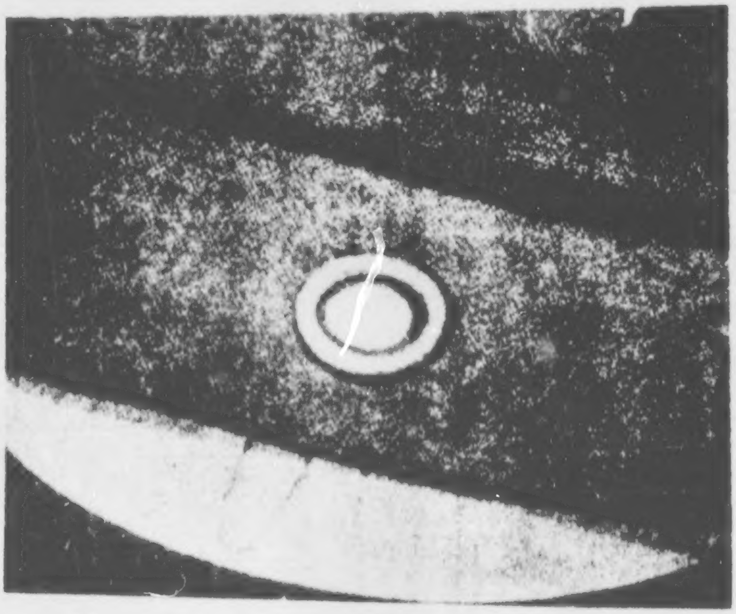

Figure 21 Hand-worked grommet, showing iron ring being centered on grommet hole.

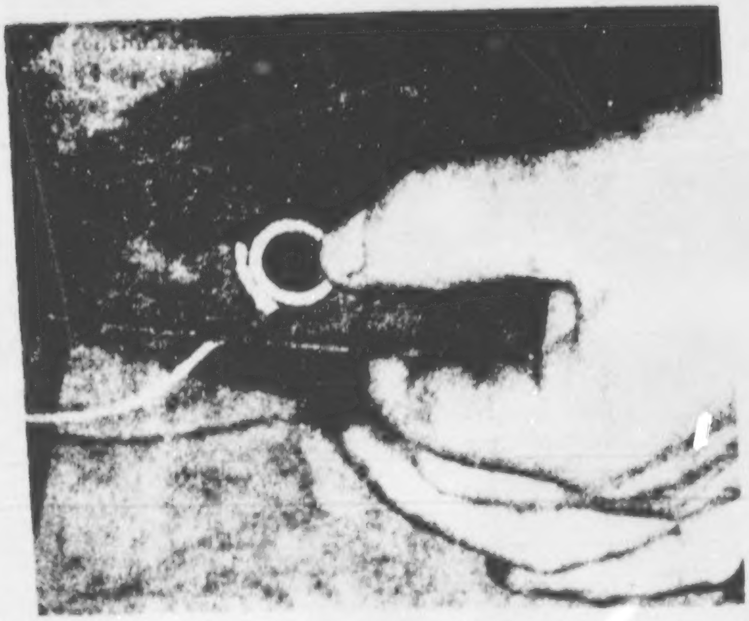

Figure 22 Hand-worked grommet, showing location of 1/2-inch thread end.

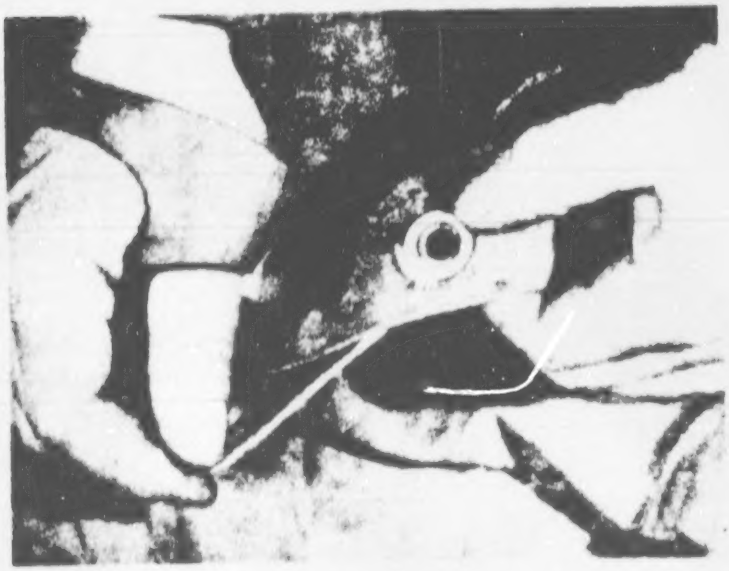

Figure 23 Hand-worked grommet, showing method for securing the end of the thread.

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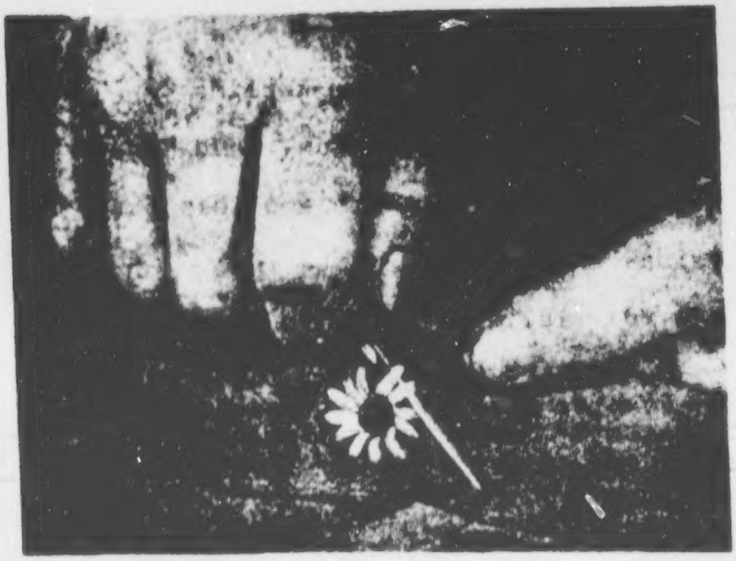

Figure 24 Hand-worked grommet, showing method of finishing off the stitching.

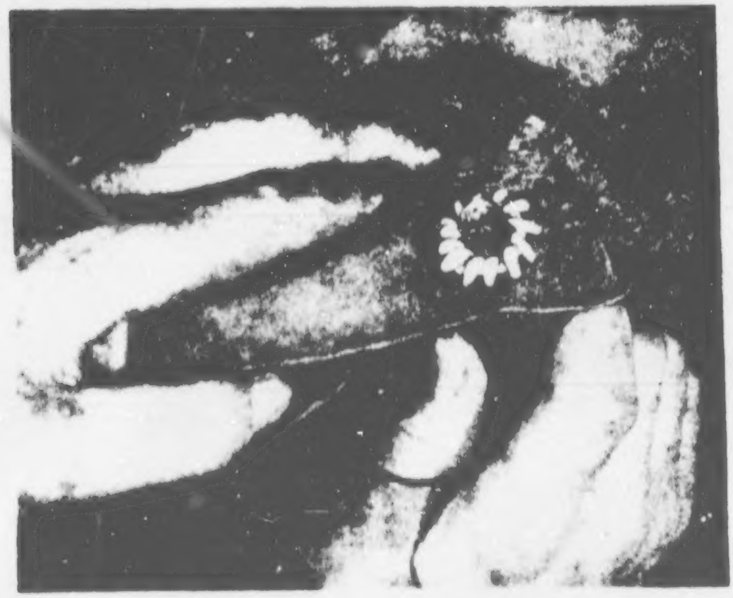

Figure 25 Hand-worked grommet, showing the stitching being flattened with a wood fid.

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QMS 244.8 [illegible]

U.S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: B-4 Nomenclature, Inspection, Hand Repair Methods

INSTRUCTIONAL UNIT: Metal Grommets and Snap Fasteners

TYPE: Television, Practical Exercise 1

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Revolving punch, Cutters, Lead block, Rawhide mallet, Die sets, Salvage material (Canvas), Grommets, Snap Fasteners, QMS 244.8 L/PG Learning Performance Guide, Video Tape Cassette Player Set

TRAINING AIDS: Video Tape Cassette Player Set, Cassette Tape Cartridge VT 760-101-02828 Metal Grommets and Snap Fasteners, Sample Grommets and Snap Fasteners

REFERENCES: FM 10-16, General Repair of Tents, Canvas, and Webbing, April 74, Sections II & III; QMS 244.W1, Canvas and Webbed Repair, Part I, Aug 72, Section IX; VT 760-101-02828 Metal Grommets and Snap Fasteners

STUDY ASSIGNMENTS: Recommended: Read QMS 244.W1, Canvas and Webbed Repair, Part I, Aug 72, Section IX, Pages 9.01 - 9.16

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

FEB 14 1975

LESSON TITLE: Metal Grommets and Snap Fasteners

YOUR OBJECTIVES: As a result of this instruction, given learning performance guide, appropriate references, metal grommets, snap fasteners, and pertinent tools, you will be able to select the fastener/grommet in relation to use and install the various types of metal grommets and snap fasteners in accordance with FM 10-16, Sections II & III and QMS 244.W1, Part I, Section IX, Pages 9.01 - 9.16.

INTRODUCTION: Snap fasteners and grommets are used on many items, for example: shower curtains, tents, gloves, field jackets, canteen covers, and jeep curtains. Fasteners and grommets are great time savers, they can be installed faster than other type fasteners. In addition, they make a neater appearance and are more economical to use.

DIRECTIONS:

1. Working at your own rate, you are to select and install various types of fasteners and grommets. To do so, you will need the following items:

   a. Revolving punch.

   b. Cutters.

   c. Lead block.

   d. Rawhide mallet.

   e. Die sets.

   f. Salvage material {canvas}.

   g. Grommets.

   h. Snap fasteners.

{If these items are not on hand, ask your instructor for them.}

2. Ask your instructor for the Metal Grommets and Snap Fasteners cassette tape cartridge {VT 760-101-0282B}. Enter the date and sign out time on your student progression sheet. Your instructor will direct you to a video cassette player set.

3. Check your cassette player as previously taught to assure proper operation. Place earphones on in order to prevent sound

from interfering with other students or groups.

4. Insert the cassette tape and watch the tape until the stop direction appears. At this point, stop the tape and perform as directed in the film.

5. Continue watching the tape, following directions at each step. If you have problems understanding a procedure, replay that portion of the tape over again. Should you require assistance at anytime, raise your hand and an instructor will assist you.

6. Should you feel that you need additional review and the tape is now being used by other students, refer to pages 9.01 - 9.16 in your workbook. Since these pages contain the same information that is presented visually on the tapes, you may follow the procedures listed in your workbook without missing any steps.

7. After you have completed all steps toward achieving your objective, have your work checked by an instructor. The instructor may direct you to review a certain procedure.

8. If you have correctly followed procedures, the instructor will sign off on this lesson on your student progression sheet. NOTE: Your instructor must sign his name beside each lesson on your progression sheet. This certifies that you have satisfactorily completed the lesson.

9. Turn in the cassette tape cartridge. Enter the turn-in time on your student progression sheet.

10. Your instructor will now assign your next lesson.

SECTION IX

METAL GROMMETS AND SNAP FASTENERS

PRACTICAL EXERCISE

I. Purpose and Scope.

With this instruction on metal grommets and snap fasteners, you will be able to name the different types of snap fasteners and metal grommets, explain their uses and where they are applied to canvas and webbed equipage, and be able to install new metal grommets and snap fasteners in canvas and webbed items in accordance with the standards set forth in the reference for this instruction. As you know, snap fasteners and grommets are used on many items. For example: shower curtains, tents, gloves, field jackets, convertible tops, and so on. The use of a particular snap fastener or grommet actually depends on the end item it is being applied to and what function is required. For instance, a cover that has to be removed quite frequently from a frame would be more functional with fasteners that could come apart from each other more easily and quicker. Grommets with tie ropes would take longer.

II. References.

TM 10-269

III. Supplies and Tools Required.

Grommets
Revolving 6 tube punch/cutter
Snap fasteners
Die sets
Rawhide mallet
Lead blocks
Cutters
Material

IV. Performance Standards. Use the following performance standards to check your performance.

A. Proper Clinching of Grommets and Fasteners.

B. Proper Placement of Barrel Section of Grommet.

C. Overall Neatness of Completed Work.

D. Proper Fastening of Fasteners. (Cap and socket, not cap and stud together)

V. Procedures for Installing Grommets and Snap Fasteners.

A. Definition. A die inserted grommet is a two part metal grommet consisting of a male part, called a barrel, and a female part, called a washer.

B. Type of Grommets.

1. The "A" type grommet has a plain washer and barrel and is used for lightweight material, for example: shower curtains.

2. The "B" type grommet has a smooth barrel, the washer is made with one row of spurs that has a better ability to hold firmly. They are used for shelter halves or medium weight material.

3. The "C" type is known as the roll rim spur and consists of a barrel and washer. The washer has two rows of spurs. The barrel has a rim under the outside edge to give the grommet more strength. This grommet is used on truck covers and general purpose tents or on items where the strain is great.

C. Sizes of Metal Grommets.

1. Metal grommets range in size from double zero (00) up to size 10 although in the Army we only use double zero up to size 6.

2. The size grommets most commonly used are 2, 4 and 5 for the repair of canvas and webbed items.

3. The number 2 grommet is used mostly on light weight material such as covers, curtains, etc., the number 4 grommet is used for the eaves of tents and medium weight material. The number 5 grommet is used on duffel bags, truck tarps and heavy material.

D. Die Sets for Grommets.

1. Die sets are devices used to clinch the grommet into the material. Die sets come in two parts, one being the male, and the other female or otherwise known as the chuck. They are also stamped with the size and type A, H, or C to fit the appropriate grommet.

2. Before installing a grommet, it is necessary to know which part goes on top and which part goes on the bottom. The barrel of the grommet will always be on the underside or bottom of the item, and the washer will always be on the outside or top of the material (finished side).

E. Snap Fasteners, Style #1.

1. Description. The style #1 snap fastener is a two part fastener consisting of a male section and a female section. The female section comes in two parts, the socket and the clinch plate. The male section is also in two parts, the stud and the stud washer. The stud is made in two sizes, single and double, the double stud being twice as long as the single stud and able to hold fast on additional ply of material with the socket.

2. The style #1 snap fastener is used for truck curtains, jeep tops and gas mask carrying cases, boat tops and can be attached to wood or metal.

3. To attach the female section (style #1 snap fastener) to a piece of material, place it at least 1/2" from the edge, with the dot of the fastener facing toward the outside edge. The reason for this is so that there would be enough material from the edge to grasp. If all dots were faced toward the inside edges, the wind could very easily lift the cover from the fastener studs.

NOTE: Because this fastener has to be unfastened by lifting from the "dot" on the fastener, it is known as a "Lift the Dot" fastener.

F. Snap Fastener, Style #2.

1. Description. The style #2 snap fastener consists of a female section of two parts, a cap and a socket. (The cap will always go to the outside and the socket will be attached to the underside of the cap). The male section consists of a stud and a post. (The male section is attached to the bottom ply with the post under the material and the stud on the top).

2. The style #2 snap fastener is replacing the style #2 on many items. (For example: the canteen cover). This type fastener is used on shelter halves, field jackets, boat tops, convertible tops and gloves (hand), etc.

NOTE: Another name that this fastener is known as, is "Glove Fastener".

3. To attach the female section (style #2 snap fastener) to a piece of material, place it at least 1/2" from the edge. This is done so that there would be enough material from the edge to grasp for unfastening the snap fastener.

G. Procedure. To insert a brass grommet, proceed in the following manner:

NOTE To prevent any possible injuries, never use the floor as a cutting block, always use the lead block or a wooden block to prevent damage to cutters. Also never use a hammer on the cutters or dies, use the mallet. A hammer will cause the die set to crystalize and break, and the pieces could fly into your eyes and cause serious damage.

1. If it is necessary to cut a new grommet hole, lay the material on the lead block and cut the hole with the grommet hole cutter (size 1/2" cutter) and drive with a mallet by hammering (3 hard bangs is usually enough to cut a clean hole).

2. Insert the barrel of the grommet from the bottom side of the material and place the grommet and the material over the number 4 die set.

NOTE: The barrel portion of the barrel should fit snug into the material.

3. Place the washer of the grommet spurs down over the grommet barrel.

4. Insert the male section of the die into the grommet barrel and with a mallet blow, clinch together the grommet barrel

669 and washer. If properly done the grommet barrel edge will be given a smooth roll.

NOTE: Failure to use the proper die will result in faulty clinching of the grommet halves and may sometimes split the grommet barrel edge.

H. Procedure for Installing the Female Half of the Style #1 Snap Fastener.

NOTE: The irregular placement of the socket perforations above the center hole make it imperative that the socket punch be set properly before making the cut. A properly inserted socket will have its smaller prongs (in width) always toward the outer edge of the item being repaired.

1. Place the material on a lead block centering the area in which the socket is to be inserted.

2. Center the socket punch over the fastener location and with a mallet blow, make a center hole for the socket opening (for the socket prongs).

3. Insert the socket into the prepared perforations with prongs extending through from the bottom to the top of the material.

4. Fit the clinch plate on the socket prongs (with the bevel part of the clinch plate facing up).

5. With a riveting hammer, or with the top end of the socket punch, bend the socket prongs towards the center flattening the prongs against the clinch plate until the plate and the sockets are securely clinched to the material.

I. Procedure for Installing the Male Half of the Style #1 Snap Fastener.

1. With the installed female half, place and align it on the material where the male section will be, using a pencil to make a mark through the hole of the female section.

2. On the mark cut a hole in the material, using a tube on the revolving punch that will cut a hole small enough to allow a tight fit around the stud barrel.

3. Place the barrel of the stud down into the material. Place the inserted stud down in the anvil.

4. Fit the washer over the stud barrel with the curved side of the washer up.

5. Place the style #1 snap fastener stud set on the stud barrel and with a mallet blow, clinch the stud and washer to the material.

NOTE: The stud should be tight enough so that it cannot turn in the material.

J. Procedure for Installing the Male Section of Style #2 Snap Fastener.

1. Cut a hole in the material, using a tube of the revolving belt punch that will cut a hole small enough to fit tightly over the barrel of the post.

2. Insert the post barrel through the hole into the material, from the bottom side up and seat the post on the anvil.

3. Put the stud over the barrel of the post and using the post, place the post set of the barrel on the post and, with a mallet blow, clinch the post and the stud to the material.

K. Procedure for Installing the Female Section of Style #2 Snap Fastener.

1. Cut a hole in the material, using the same tube of the revolving punch as used for the male section and cut a hole.

2. Insert the barrel of the cap through the hole in the material (outside on top of material).

3. Place the inserted cap barrel up, on the anvil. Fit the socket over the barrel of the cap.

4. Place the snap fastener set on the barrel of the cap and with a mallet blow, clinch the cap of the socket to the material. NOTE: The female section of the style #2 snap fastener is always installed to the top side of the item being repaired, and with the cap also facing to the top side.

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Figure 26. Cutting hole for a metal grommet.

Figure 27. Appearance of cut hole for metal grommet.

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Figure 28. Inserting washer part of grommet.

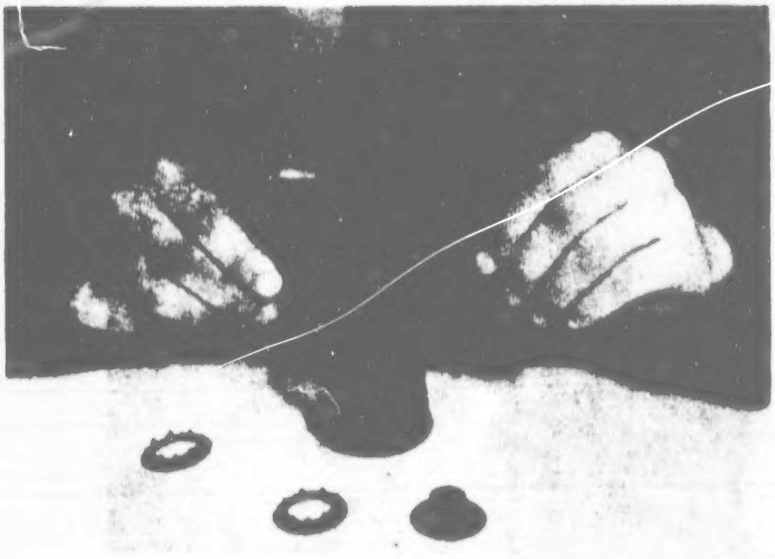

Figure 29. Inserting barrel part of grommet.

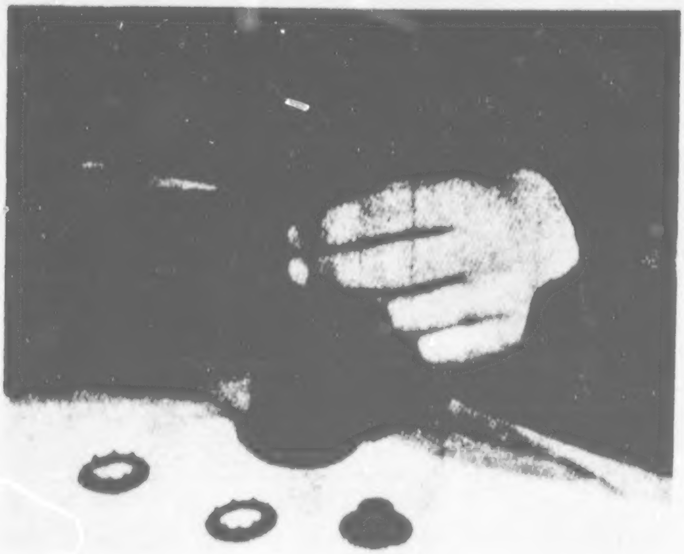

Figure 30. Clinching washer with barrel part of grommet.

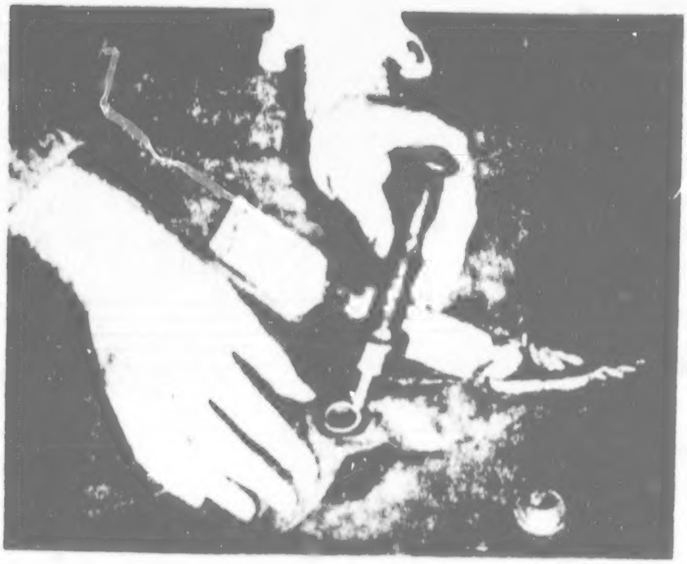

Figure 31. Appearance of clinched grommet.

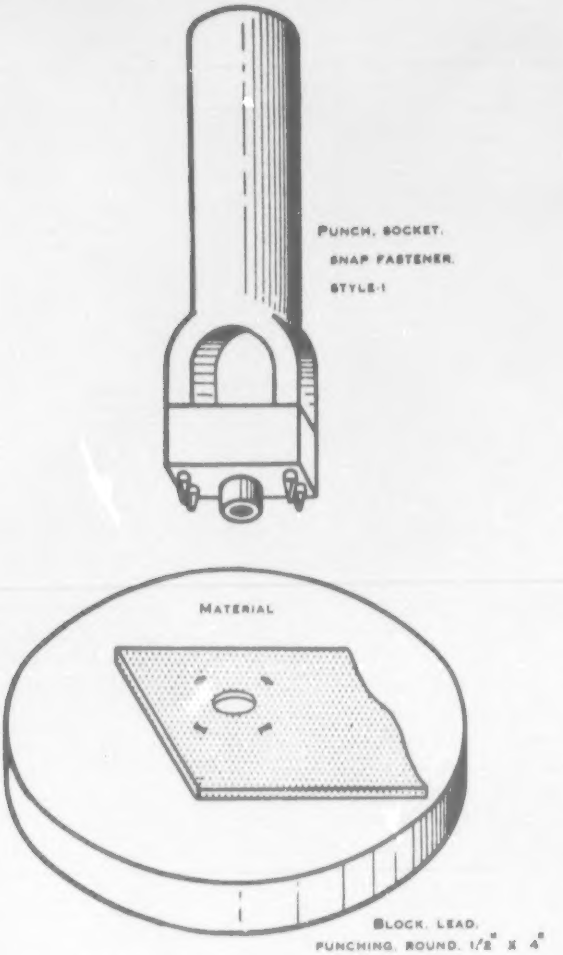
PUNCH, SOCKET,
SNAP FASTENER,
STYLE-1
MATERIAL
BLOCK, LEAD,
PUNCHING, ROUND, 1/2" X 4"

Figure 32. Cutting and perforating material for installation of style 1 snap fastener socket.

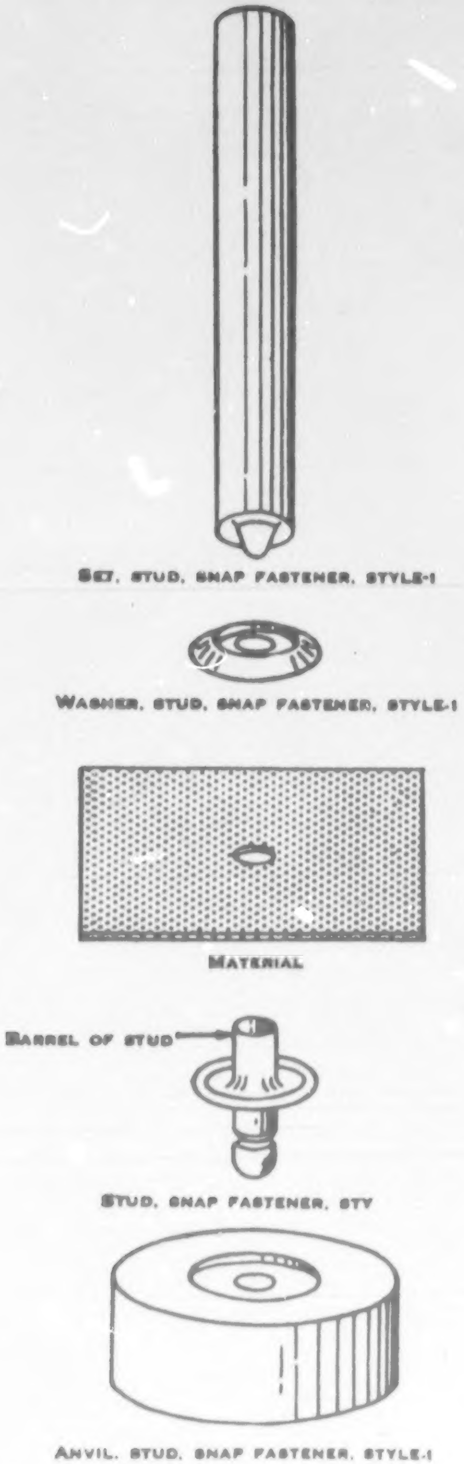
SET, STUD, SNAP FASTENER, STYLE-1
WASHER, STUD, SNAP FASTENER, STYLE-1
MATERIAL
BARREL OF STUD
STUD, SNAP FASTENER, STY
ANVIL, STUD, SNAP FASTENER, STYLE-1

Figure 33. Installation of style 1 snap fastener stud.

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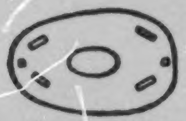
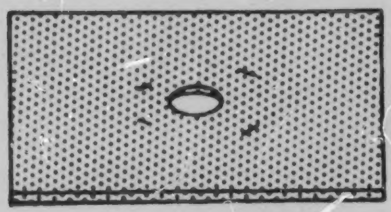
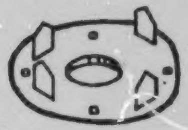


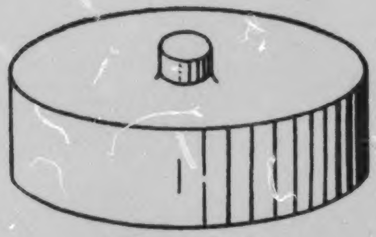
PLATE, CLINCH,
SNAP FASTENER, STYLE-1



MATERIAL



SOCKET,
SNAP FASTENER, STYLE-1



ANVIL, SOCKET,
SNAP FASTENER, STYLE-1

Figure 34. *Installation of style 1 snap fastener socket.*

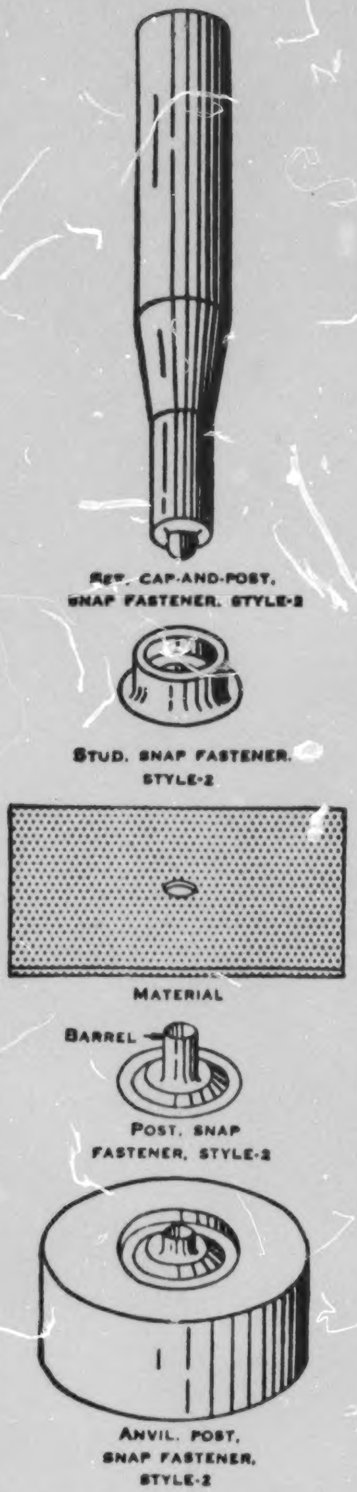

REF. CAP-AND-POST, SNAP FASTENER, STYLE-2
STUD, SNAP FASTENER, STYLE-2
MATERIAL
BARREL
POST, SNAP FASTENER, STYLE-2
ANVIL, POST, SNAP FASTENER, STYLE-2

Figure 35. *Installation of style 2 snap fastener stud.*

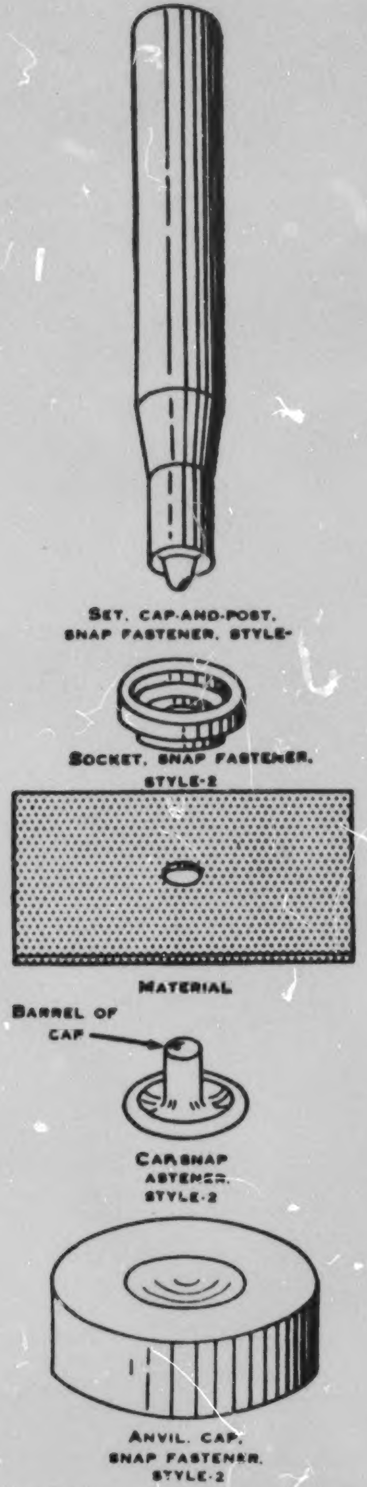

SET, CAP-AND-POST, SNAP FASTENER, STYLE-
SOCKET, SNAP FASTENER, STYLE-2
MATERIAL
BARREL OF CAP
CAP, SNAP FASTENER, STYLE-2
ANVIL, CAP, SNAP FASTENER, STYLE-2

Figure 36. *Installation of style 2 snap fastener socket.*

U. S. ARMY QUARTERMASTER SCHOOL

Learning Performance Guide

COURSE: Canvas and Webbed Equipage Repair

ANNEX: B-5 Nomenclature, Inspection, Hand Repair Methods

INSTRUCTIONAL UNIT: Chemical Treatment of Canvas

TYPE: Television, Practical Exercise 1

TOOLS, EQUIPMENT, AND MATERIALS: Waterproofing Compound, Wire Brush, Bristle Brush, Stoddard Solvent, Rags, and Fire Extinguisher.

TRAINING AIDS: Salvage Canvas Materials, Cassette Tape VT 760-101-0287B

REFERENCES: FM 10-16, General Repair of Tents, Canvas and Webbing, April 1974, Chapter 3, Para 14; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section XI; and VT 760-101-0287B, Chemical Treatment of Canvas

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section XI, Pgs 11.01 - 11.05.

STUDENT UNIFORM AND EQUIPMENT: Wear fatigues and bring to class all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

1975

LESSON TITLE: Chemical Treatment of Canvas

YOUR OBJECTIVE: As a result of this instruction, given references, waterproofing compound, wire brush, bristle brush, stoddard solvent, rags, fire extinguisher, salvage canvas, video cassette player set, student learning and performance guide, and cassette tape VT 760-101-0284B, you will be able to chemically treat canvas and tentage to render it fire resistant, waterproof, and mildew resistant in accordance with standards prescribed in FM 10-16, GENERAL REPAIR OF TENTS, CANVAS, AND WEBBING, Chapter 3, Para 14.

INTRODUCTION: When the paint on your home becomes flaked and thin, and the wood begins to show, you do not postpone protecting the bare wood with a coat of paint. The same principle applies to tentage. The waterproofing compound has eroded or been washed away from the surface of the material; it will require retreatment with chemical compound. This in turn will save the Army the price of a new tent.

DIRECTIONS:

1. Working at your own pace, you are to mix and treat salvage canvas with waterproofing compound. Due to this being a classroom exercise, only the brush method will be used. To perform the practical exercise, you will need the following items:

a. Waterproofing compound. (Note: the instructor may issue water in lieu of the compound).

b. Video cassette tape player set and cartridge VT 760-101-0284B.

c. Wire Brush.

d. Bristle Brush.

e. Stoddard Solvent.

f. Rags.

g. Fire Extinguisher.

h. QMS 244.W1 (Student Workbook).

If these items are not on hand, ask your instructor for them.

2. Ask your instructor for the cassette tape, Chemical Treatment of Canvas (VT 760-101-0287B). Enter the date and time on your student progression sheet. Your instructor will direct you to a video cassette player set.

3. Check your cassette player, as previously taught, to assure proper operation. Place earphones on, in order to prevent sound from interfering with other students or groups.

4. Insert the cassette tape, and watch the tape until the stop direction appears. At this point, stop the tape and perform as directed in the film.

5. Continue watching the tape, following directions at each stop. If you have problems understanding procedures, replay that portion of the tape over again. Should you require assistance at anytime, raise your hand and an instructor will assist you.

6. Should you feel that you need additional review and the tape is being used by other students, refer to pgs 11.01-11.05 in your workbook. Since these pages contain almost the same information as the tapes, you may follow the steps in your workbook without missing the correct procedures.

7. After you have completed all steps toward achieving your objective, have your work checked by an instructor. The instructor may direct you to review a certain procedure.

8. If you have correctly followed procedures, the instructor will sign off on this lesson on your student progression sheet. Note: The instructor must sign his name beside each lesson on your progression sheet. This certifies that you have satisfactorily completed the lesson.

9. Turn in the cassette tape cartridge. Enter the turn-in time on your student progression sheet.

10. Your instructor will assign you to your next lesson.

SECTION XI

CHEMICAL TREATMENT OF CANVAS

PRACTICAL EXERCISE

I. Purpose and Scope.

With the instruction in this section, you will be able to apply the chemical compound to canvas and tentage to render it fire resistant, waterproof, and mildew resistant, in accordance with all safety and workmanship precautions and standards as set forth in TM 10-269. When the paint on your house becomes flaked and thin and the wood begins to show, you do not postpone protecting the bare wood with a coat of paint. The same is true for tentage. When the waterproofing chemical has eroded or has been washed away by the rain or affected by the sun, it is time to retreat the tent by chemical application.

II. Orientation.

You might be asking yourself just what has any type of chemical treatment have to do with us? Well, gentlemen, anything that has to do with the repair of canvas items is part of your primary duties as a Canvas and Webbed Repairman. While a tent would have been ready for salvage without the chemical compound, if properly retreated, it has the serviceability required by Army regulations and can be reissued. We have thus increased the life of the tent and also saved the government money. In time of conflict the transportation of ammunition, supplies, and food are of primary importance. In repairing tentage in the field we save the space and time that it would take to transport these tents to a rear area. The chemical treatment does more than just waterproof the canvas. It also makes the canvas mildew resistant and fire resistant.

III. References.

TM 10-269

IV. Supplies and Tools Required.

Pieces of material to be waterproofed
Waterproofing compound
Brushes
Buckets

V. Performance Standards. Check your work by these standards.

A. Tent or Material Should Be Clean and Free of All Dirt and Foreign Matter.

B. Waterproofing Compound Spread Even and Smooth (no lumps or too thick).

C. Seams and Patches are Well Covered.

VI. Procedure for Applying Chemical Compound to Canvas Items.

A. Methods of Applying Chemical Compound.

1. Hand brush method. This consists of dipping a wide brush in the compound then applying the compound onto the canvas with long vertical strokes. This method gives the best protection because it produces good penetration and evenness.

2. Dip method. The dip method consists of dipping a rag into the compound and wiping the compound on the canvas with long strokes of the rag. It is easy to see why we cannot dip the whole article in the compound; in the case of tents, the tub would have to be too large and we would treat both sides of the article which is both unnecessary and expensive.

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3. Spray method. It is the fastest method known. Care must be taken to apply an even coat. To improve penetration of the compound we can work it into the canvas by means of a brush.

B. Retreatment of Canvas. To increase its durability, tentage should be retreated as required. Tentage may be recolored, waterproofed, and fungusproofed with compound, textile, preservative, mildew-resistant, solvent type, paste form, pigmented. Procedure for retreatment is as follows:

1. Make sure tent is dry. Remove dirt, oil, and grease stains.

2. Treat tents when they are erected or raise them with an overhead block hoist, as appropriate.

3. Stir compound before it is diluted with an equal amount of Stoddard solvent and again before it is used. Approximately 1 gallon of the diluted compound is sufficient to cover 10 square yards of fabric surface (one coat).

NOTE: Approximately 2 1/2 to 3 gallons are needed to apply one coat to a GP small tent.

4. Apply the compound by brush or spray gun. If spray gun is used, the operator should wear utility clothing, a respirator, and a helmet liner.

5. Apply compound to tent top first. Then pull tent up off the ground and finish the operation. Apply the compound generously to patches and newly repaired areas.

6. Let the tent dry. Drying times vary according to drying method used.

WARNING: If the compound, which contains a strong fungicide, is handled carelessly, it may enter the body through the skin or through inhalation. Therefore, after treating tents, personnel who used the compound should wash thoroughly. Fire precautions are necessary during application because the compound is flammable.

C. Retreatment of Seams. Tent and paulin sewn seams may require further waterproofing. The procedure for retreating seams is as follows:

1. Make sure tent or paulin is dry. Remove dirt, oil, and grease stains.

2. Display seams on a hard flat surface.

3. Stir compound thoroughly before diluting it with an equal amount of Stoddard solvent and again before using it.

4. Apply two coats to the outside of every tent or paulin seam. Use a 4 inch wide stiff paintbrush to apply a brush-wide stripe of retreating compound over the length of the seam.

5. Give special attention to all webbing attachments and turnbacks of webbing reinforcements.

6. Air-dry the first coat for at least 4 hours before applying the second coat. However, the 4 hour drying period may be reduced by using hot air to drive the solvent out of the compound.

7. When the first coat is dry to the touch, apply the second coat. After applying the second coat, allow the seams to dry at least 24 hours before repacking or erecting.

D. Safety Precautions.

1. Insure that the compound is applied to the tentage and/or canvas items in a well ventilated area.

2. Do not use gasoline as a substitute for solvent as a mixture.

3. Do not fold a tent that has just recently been treated with the waterproofing compound, allow approximately 24 hours of drying time before folding.

4. Allow no smoking in working area while applying compound to tentage and canvas items.

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: B-6 Nomenclature, Inspection, Hand Repair Methods

INSTRUCTIONAL UNIT: Whipping and Splicing Ropes; Knot Tying and Hitches

TYPE: Television, Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Tool kit, Beeswax, Cord, Rope, QMS 244.11 L/PG Learning and Performance Guide, Video Tape Cassette Player Set, Colored Adhesive Tape

TRAINING AIDS: Video Tape Cassette Player Set; Cassette Tape Cartridge VT 760-101-02848, Whipping and Splicing Ropes, Knotting and Hitches; Sample Knots, Hitches, and Spliced Ropes

REFERENCES: TM 5-725, Rigging, Oct 68, Chap 2; FM 10-16, General Repair of Tents, Canvas, and Webbing, April 74, Section IV; QMS 244.W1, Canvas and Webbed Repair, Part I, Aug 72, Section XII; VT 760-101-02848, Whipping and Splicing Ropes, Knotting and Hitches

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Canvas and Webbed Repair, Part I, Aug 72, Section XII, Pages 12.01 - 12.21

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

LESSON TITLE: **Whipping and Splicing Ropes; Knot Tying and Hitches**

YOUR OBJECTIVE: As a result of this instruction, given learning performance guide, appropriate references, cassette tape cartridge VT 760-101-0284B, tool kit, beeswax, cord, and rope, you will be able to determine the use of each knot and hitch, and tie each; and whip and splice ropes in accordance with standards prescribed in TM 5-725, Chap 2; FM 10-16, Section IV; QMS 244.W1, Part I, Section XII, Pages 12.01 - 12.21; and VT 760-101-0284B, Whipping and Splicing Ropes, Knotting and Hitches.

INTRODUCTION: A knot improperly tied, a hitch or splice not properly secured, or a rope improperly whipped can cause damage to equipment or even to human life. Since ropes are attached to many items, including tents, tarps, and cargo slings, tieing and splicing ropes, knots, and hitches are important job tasks performed by every canvas and webbed repairman. Ropes will wear, dry rot, and deteriorate due to age, climatic conditions, and use. If not replaced as required, excessive cost may result as the end item will have to be salvaged.

DIRECTIONS:

1. Working at your own pace, you are to:

    a. determine the use of each knot and hitch.

    b. tie each knot and hitch.

    c. whip and splice ropes.

2. You will need the following items:

    a. Tool kit.

    b. Beeswax.

    c. Cord.

    d. Rope.
    e. Colored Adhesive Tape.

{If these items are not on hand, ask your instructor for them.}

3. Ask your instructor for the Whipping and Splicing Ropes, Knotting and Hitches cassette tape cartridge {VT 760-101-0284B}. Enter the date and sign out time on your student progression sheet. Your instructor will direct you to a video cassette

player set.

4. Check your cassette player as previously taught to assure proper operation. Place earphones on in order to prevent sound from interfering with other students or groups.

5. Insert the cassette tape and watch the tape until the stop direction appears. At this point, stop the tape and perform as directed in the film.

6. Continue watching the tape, following directions at each stop. If you have problems understanding a procedure, replay that portion of the tape over again. If you need help at anytime, raise your hand and an instructor will assist you.

7. If you feel that you need to review the tape once again but the tape is now being used by other students, turn to pages 12.01 - 12.21 in your course workbook. These pages contain the same information that is shown on the tapes. You may follow the procedures listed in your workbook without missing any steps.

8. After you have followed all instructions, have your work checked by an instructor. The instructor may have you go over certain parts of the lesson once again.

9. If you have followed all directions and achieved your objectives, the instructor will sign your student progression sheet. NOTE: The instructor must sign his name beside each lesson on your progression sheet. This certifies that you have satisfactorily completed the lesson.

10. Turn in the cassette tape cartridge. Enter the turn in time on your student progression sheet.

11. Your next assignment is to take the Hand Repairs Examination. For this examination you will be required to demonstrate your ability to:

   a. Construct a handworked grommet.

   b. Splice a rope through the handworked grommet by means of an eye splice.

   c. Whip the end of spliced rope.

Though you should now be able to demonstrate your ability to perform the tasks on the examination, you may wish to review the following pages or cassette video tapes:

Handworked grommet	QMS 244.W1, pages 8.02-8.10, FM 10-16, pages 44 - 48	VT 760-101-0283B
Eye splice	QMS 244.W1, pages 12.14 - 12.15 and FM 10-16, page 58	VT 760-101-0284B
Whipping	QMS 244.W1, pages 12.04 - 12.06	" " "

If you are not able to preform these tasks at an acceptable level, your instructor may require you to review the material and again demonstrate your ability to perform these tasks before advancing you to the next lesson.

SECTION XII

WHIPPING AND SPLICING ROPE: TYING KNOTS AND HITCHES

PRACTICAL EXERCISE

I. Purpose and Scope.

This instruction will enable you to apply beeswax to cord, make a whipped end in a rope to prevent raveling, join two pieces of rope together by means of a short or long splice, weave an eye into the ends of a rope to form a permanent end for eave lines and guy lines, and tie proper knots and hitches when handling rope in canvas repair or shipping.

II. Orientation.

This instruction is a guide and basic reference for personnel whose duties requires the use of rope.

A. A knot improperly tied, a hitch or splice not properly secured, or a rope imporperly whipped can cause damage to equipment or even to a human life. That is why whipping, splicing rope, and tying knots and hitches are important to you.

B. Rope is a very expensive item, because most of it is imported. Most items that are imported have a heavy "duty" (taxes) placed on them. Therefore, we must be conservative with use of rope. Once you have learned the proper methods you can save yourself money, because you are also a tax payer.

III. References.

TM 5-725
TM 10-269

IV. Supplies and Tools Required.

Knife
Beeswax
Cord
Rope

V. Performance Standards. Use the performance standards to check your work.

A. Whipping should be tightly wound on the rope end with no overlaps.

B. Whipping should be 1 inch long and 1/2 inch from the rope end.

C. The eye splice must have three tucks weaved into the standing part of the rope.

D. The eye of the eye splice must be large enough to slip over a tent pin.

VI. Discussion and Practical Exercise.

A. Description and Fabrication of Rope.

1. Manila. Manila rope is made from the leaf stalk of Abaca trees. Manila fibers vary in color, from a yellow white to dark brown. The lighter shades are soft and clean and are used in the best rope. Manila rope made from lighter shades of long fibers is superior to the other darker shades in elasticity, strength and resistance to wear and deterioration.

2. Sisal. Sisal rope is made from agave leaves. It is a strong, durable white fiber and about 80% as strong as high quality manila rope. To the touch it has a coarse feeling. Sisal rope stands exposure to sea water very well and is used in many installations for this reason.

3. Hemp. Hemp rope is made of fibers from the stalk of the hemp plant, which is cultivated extensively in many parts of the world. Hemp rope is almost invariably tarred. The tar preserves the rope from deterioration due to dampness, but reduces its strength and flexibility. Tarred hemp is known as marline and is a standard item of issue.

4. Coir and cotton. Coir rope is made from the fibers of coconut husks. It is a very elastic rough rope about one fourth the strength of hemp, but light enough to float on water. Cotton makes a very smooth white rope which stands much bending and running. Coir rope also stands much bending and running. These two types of rope are not too widely used in the military service, except that cotton is used in some cases for very small line (foot stops).

5. Nylon. Nylon is a synthetic fiber made from mineral products. Its tensile strength is approximately twice that of manila rope of the same size. The main qualities of nylon are its ability to stretch, to absorb shocks and to resume normal length when the strain is removed.

6. Fabrication.

a. In the fabrication of fiber rope, a number of fibers of various plants are twisted together to form yarns.

b. The yarns are then twisted together again in the opposite direction to form the finished rope.

c. The direction of twist of each element of the rope is known as the "lay" of that element. Twisting each element in the opposite direction puts the rope in balance and prevents its element from unlaying when a load is suspended on it.

7. Types. Fiber rope is designated by the combination of strands which make up rope.

a. The three principle types are hawser laid, shroud laid, and cable laid.

b. Hawser laid rope generally is composed of three strands laid up in a right hand direction.

c. Shroud laid usually consists of four strands laid upright handed around a center strand or core.

d. Cable laid rope usually is composed of three right handed hawser laid ropes laid up together in a left handed direction.

B. The performance steps for whipping, making the square knot, bowline, clove hitch, half hitch, timber hitch, back splice, eye splice, and short splice are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page.

WHIPPING

1.	Wax cord.	1.	Be sure cord is about 3 ft long.
2.	Form loop in waxed cord. (see fig 44)	2.	a. Lay cord along rope. b. Lay loop toward end of rope.
3.	Begin to take turns. (see fig 44)	3.	Wind cord toward end of rope evenly.
4.	Continue taking turns.	4.	Take turns up to one-half inch from end of rope.
5.	Insert loose ends of cord. (see fig 45)	5.	a. Place through loop. b. Keep tight grip on whipping.
6.	Pull knot in center of whipping. (see fig 46)	6.	Make sure whipping is tight on rope.

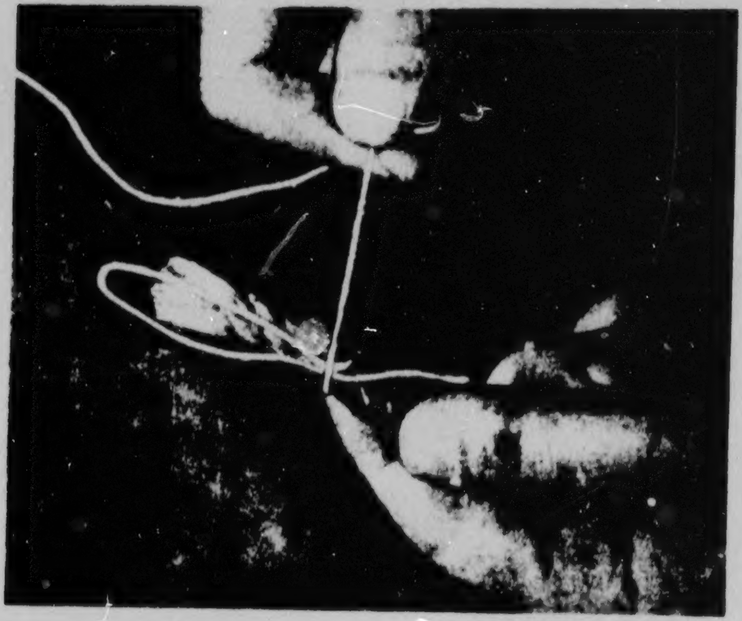

Figure 44. End whipping, showing cord looped and held in place with the first turn.

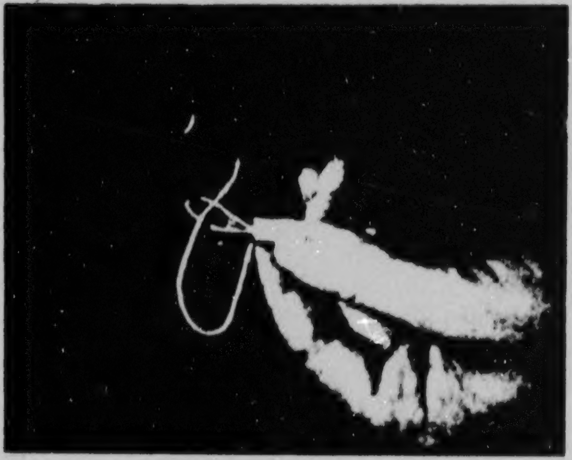

Figure 45. Whipped end, showing loose end being inserted through loop.

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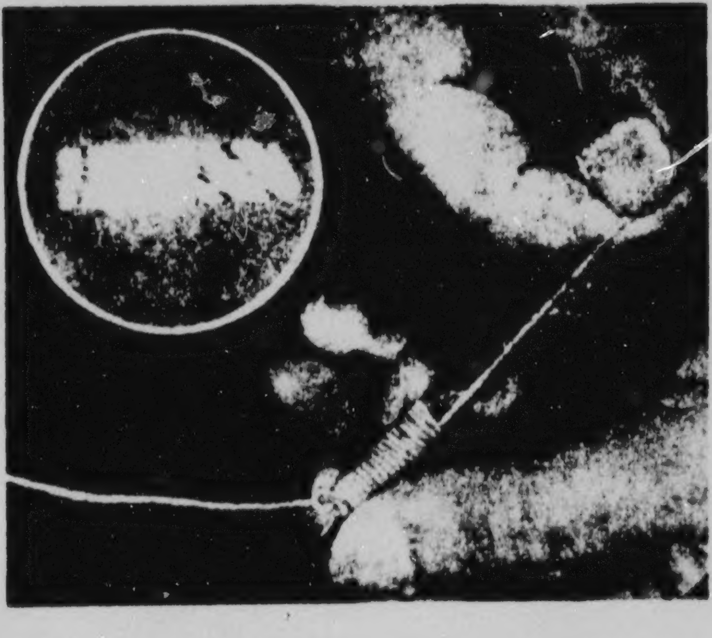

Figure 46. End whipping, showing the loop being pulled under the whipping to lock the cord ends.

NOTE: Rope can also be binded at the end in the following manner:

1. Get insulation sleeving, electrical, shrinkable plastic MI 23053, it comes in different sizes. Select a piece large enough to slip over the rope end.

2. Cut off a piece of this shrinkable plastic tubing approximately 3/4 to 1 inch.

3. Slip it over the rope so just a little of the rope end protrudes from the tube.

4. Then apply heat (match or torch flame) very carefully to shrink the tubing snug on the rope.

NOTE: Make sure to observe all fire safety precautions. This information was issued in PS Magazine 225, August 7, 1971.

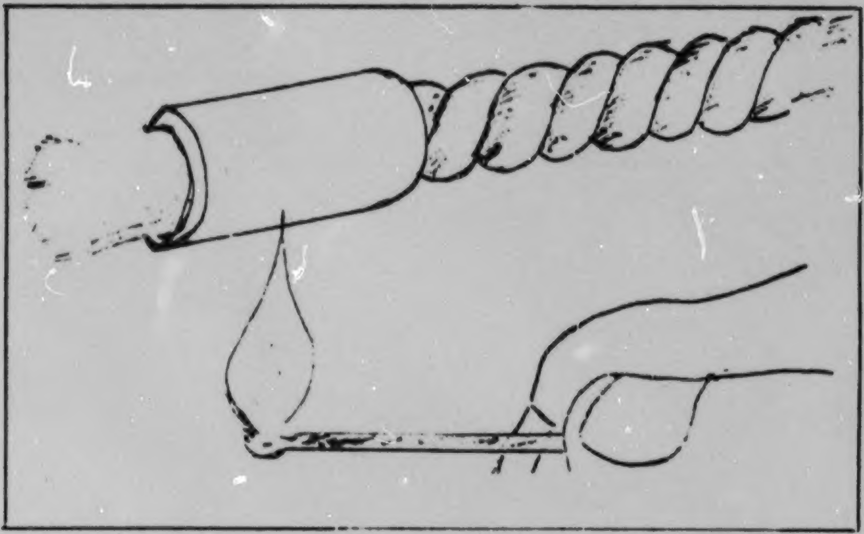

Figure. 47. PLASTIC TUBING. Slip it over the rope and apply heat. (match or torch flame.)

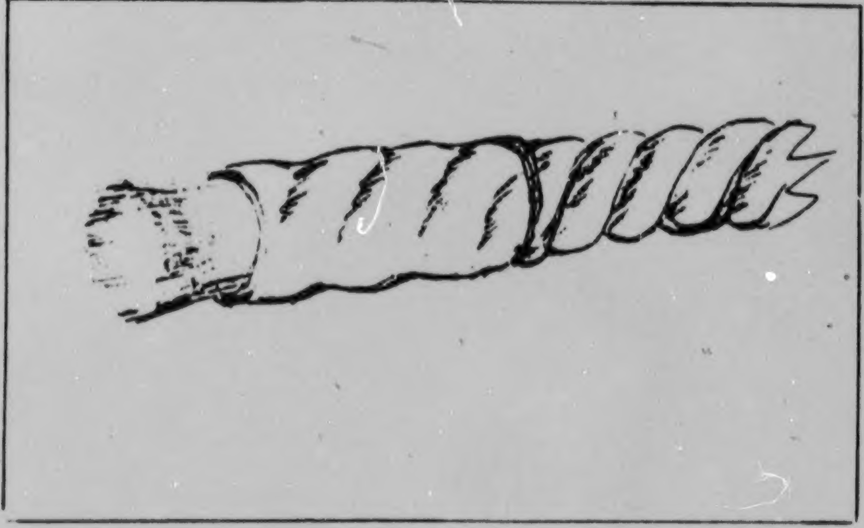

Figure. 47 A. Shrink Tubing snug to rope.

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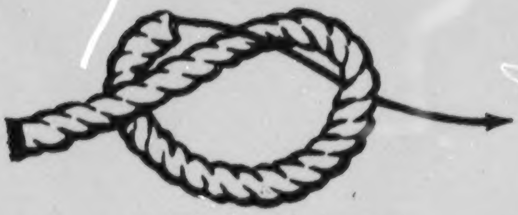
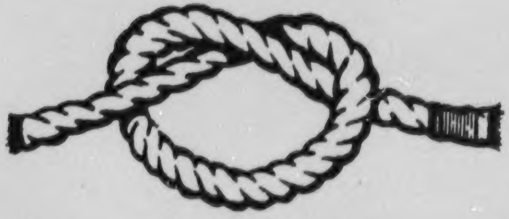
OVERHAND KNOT

1. Make a bight in rope.	1. Make bight about 2 inches in diameter.
2. Put running end through bight.	2. a. Pull running end tight. b. Do not bring knot so close.



Underhand loop



Over and down through

Figure 47B Overhand knot.

FIGURE 8 KNOT

1. Make a bight in rope.	1. Make bight about 4 inches in diameter.
2. Pass running end around standing and beyond bight.	2. Do not make bight too large.
3. Bring running end back through bight.	3. Pull running end tight.

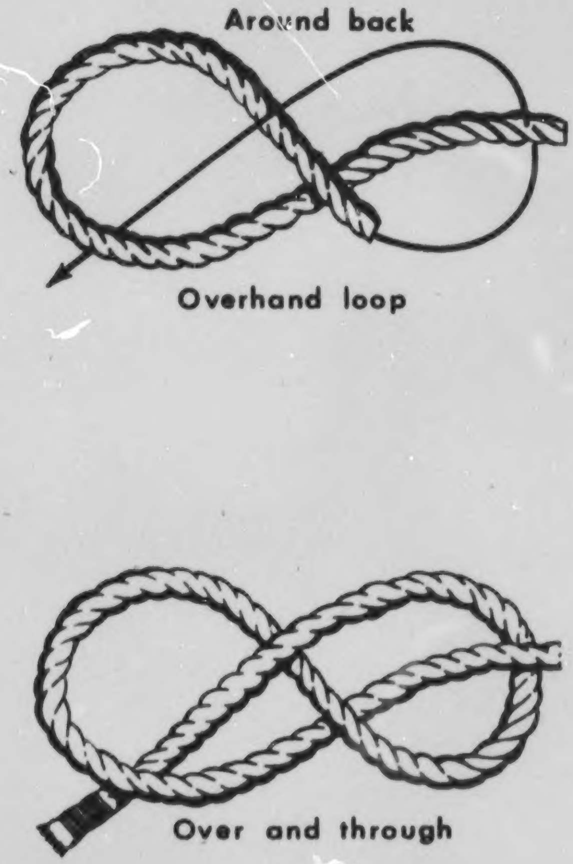
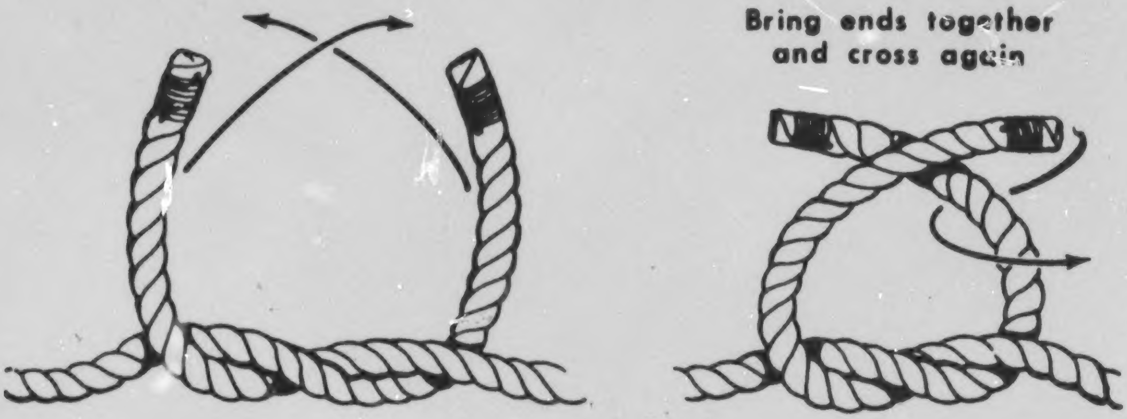

Around back
Overhand loop
Over and through

Figure 48. Figure eight knot.

SQUARE KNOT

1. Bring two ends together and cross them, making an overhand knot.
2. Cross ends so that end is alongside its own standing part.
3. Tie second overhand knot and pull knot tight.

1. Place left end over right to form overhand knot.
2. With the two ends facing up place right end over left end and cross again to form the square knot.



Bring ends together and cross again

Cross two lines

Ends must be on same side

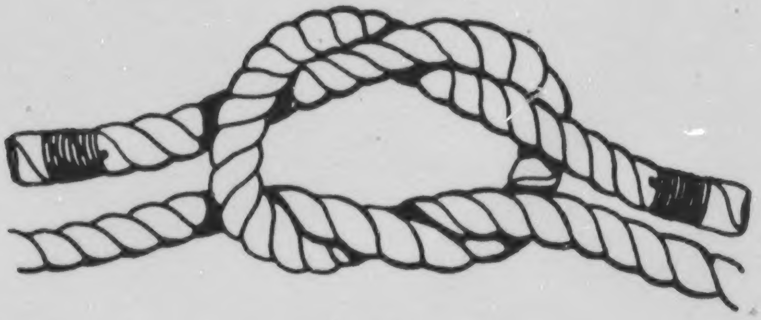


Figure 49. Square knot.

BOWLINE

1.	Make a bight in standing end.	1.	The bight should be two inches in diameter.
2.	Pass running end through bight.	2.	The running end must come up into the bight.
3.	Pass running end around standing end, over bight, and under standing end.	3.	Make sure the running end goes around the standing part of rope.
4.	Pass running parts back through bight, pulling tight. The running part is inside the loop.	4.	Make sure the running end goes down into the bight, and pull the knot tight.

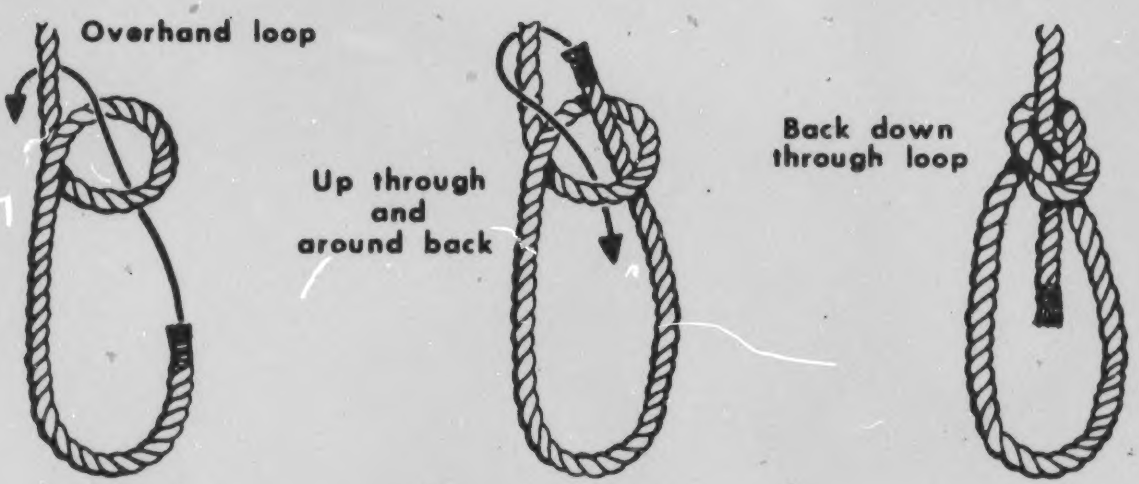

Overhand loop
Up through and around back
Back down through loop

Figure 50. *Bowline.*

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CLOVE HITCH

1. Pass the running end around timber.
2. Pass the running end around the timber once again.
3. Running end comes up under itself on second turn.

1. The running end must pass under the standing part of the rope.
2. The running end must be on top of the first round turn.
3. Pull both ends to tighten knot.

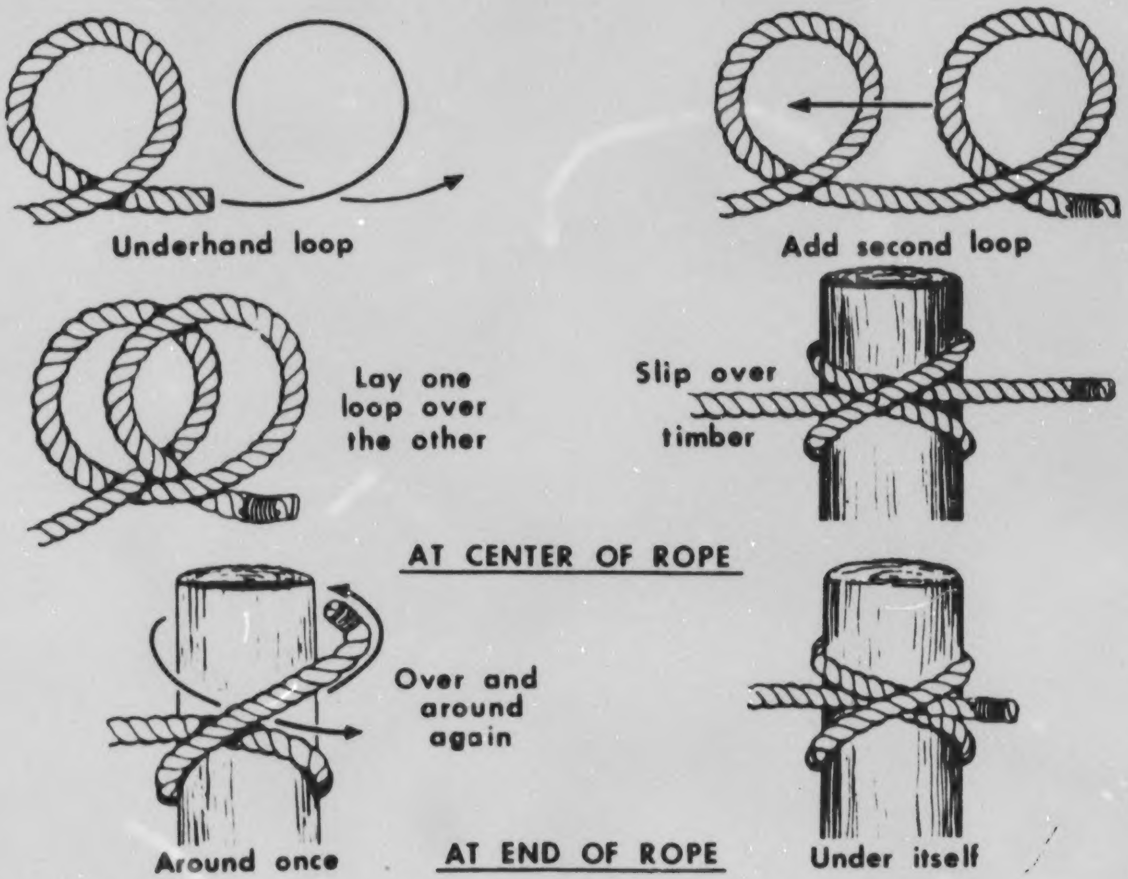

Underhand loop
Add second loop
Lay one loop over the other
Slip over timber
AT CENTER OF ROPE
Over and around again
Around once
AT END OF ROPE
Under itself

Figure 51. *Clove hitch.*

TIMBER HITCH

1. Make a half hitch around a timber.	1. Leave the half hitch loose.
2. Add two turns under itself.	2. With the running end, make two turns around the loop end and pull the running end to tighten hitch.

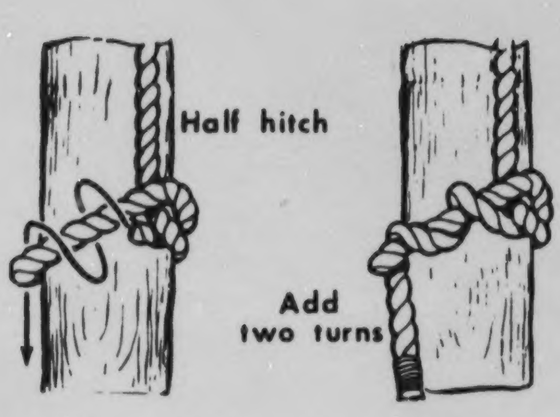
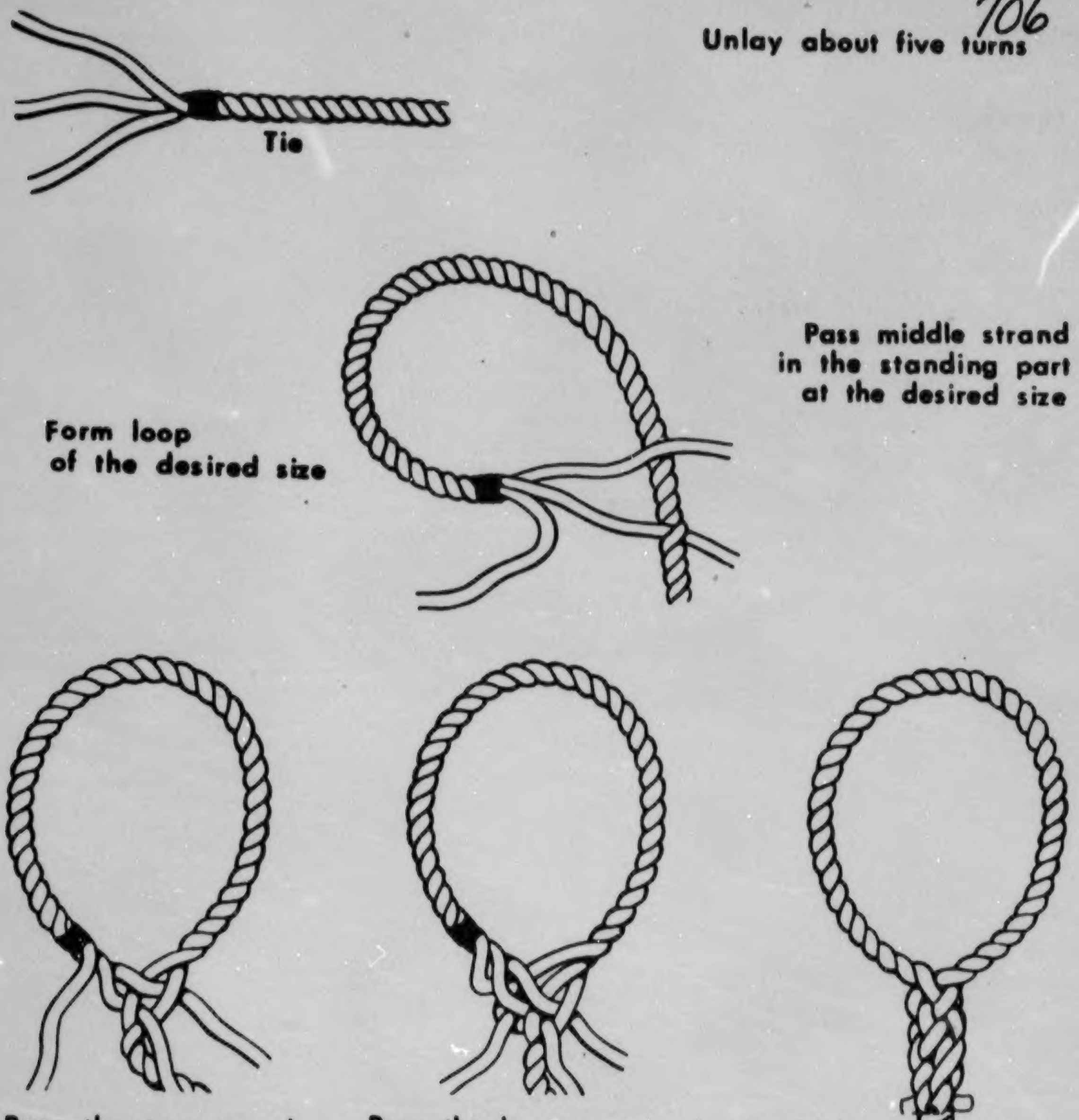


Figure 52. Timber Hitch.

EYE SPLICE

1. Unlay about five turns of rope.	1. These turns or free ends will be interlaced into the standing part of the rope.
2. Tie unlaid strands at join, (keep rope from unlaying).	2. This isn't necessary if you can manage to keep the end from unlaying.
3. Form a loop of the desired size.	3. The loop should be larger enough to fit the item it will be used for (tent pin).
4. Select the center strand and interlace it.	4. Tuck the center strand under first lay of rope and pull the center strand until it reaches the standing part of rope.
5. Interlace the right strand.	5. Tuck the right strand under the second lay of rope and pull it tight.
6. Interlace the left strand.	6. Tuck the left strand under the third lay of rope and pull it tight.
7. Continue to lace the strands for three (3) complete tucks.	7. Make sure to pull each strand tight.
8. Cut the strands.	8. Use a pair of shears and cut the strands at an angle parallel with the rope.



Unlay about five turns

Form loop of the desired size

Pass middle strand in the standing part at the desired size

Pass the top strand under the next strand in the standing part

Pass the bottom strand under the last strand in the standing part

Tuck the three strands into the standing part as in the short splice

Figure 53. Eye or side splice.

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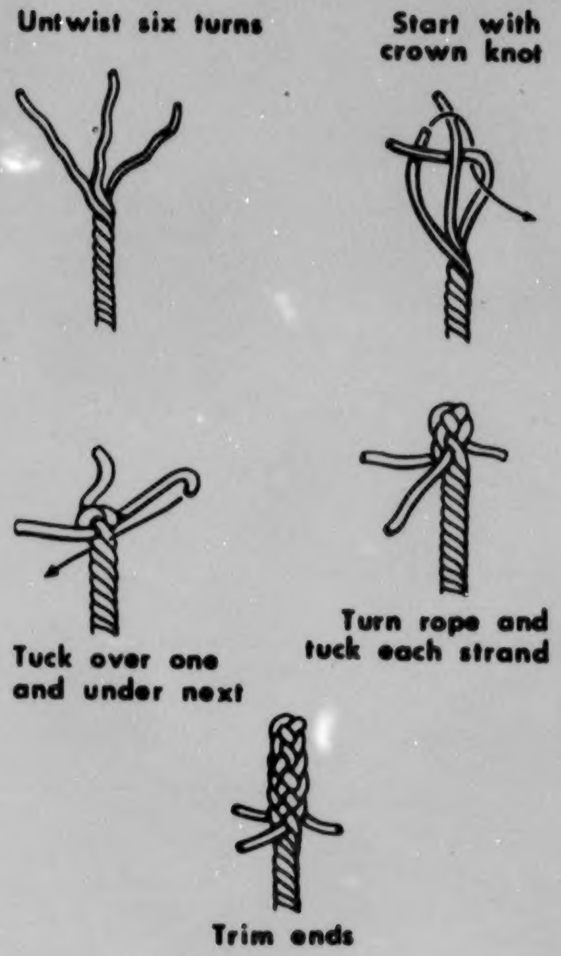
BACK SPLICE (CROWN)

1. Unlay five to seven turns of rope.	1. Keep the end twisted tight to prevent them from unlaying.
2. Hold the unlayed end up and spread them out so the center strand will be facing you.	2. Make sure the center strand crosses the right strand.
3. Pull the center strand toward you and place it against the standing part of the rope.	3. a. This strand must be held down against the standing part of the rope by placing your thumb against it. b. This strand must form a loop near the top.
4. Insert the right strand part way in the loop made by the center strand.	4. The right strand must be held by the center strand.
5. Guide the left strand around and under the end of the right end and up into the loop form by the right loop.	5. a. Pull each strand the same to form the crown. b. Make sure each strand is crossed by another strand and the knot is tight.
6. Splice the ends exposed ends from the crown knot into the standing part of the rope.	6. a. These strands are spliced in same manner as the eye splice. (See eye splice). b. Tuck 3 strands under lay of rope.



Untwist six turns

Start with crown knot

Tuck over one and under next

Turn rope and tuck each strand

Trim ends

Figure 54. *Crown or back splice.*

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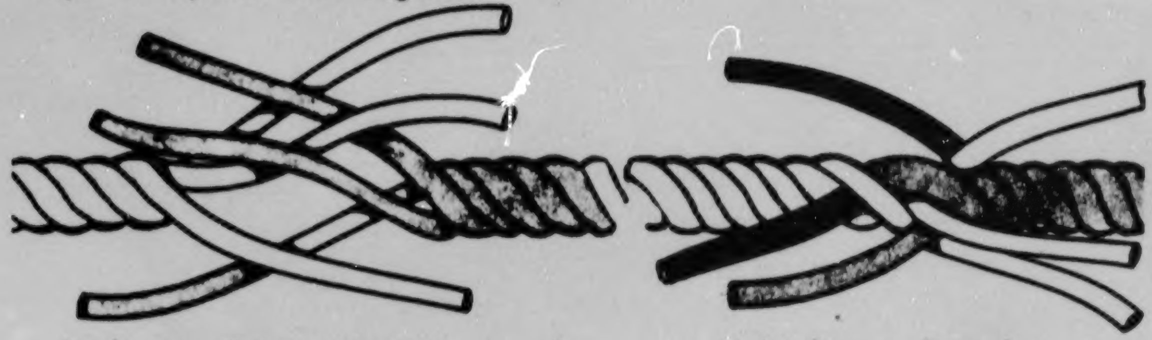
SHORT SPLICE

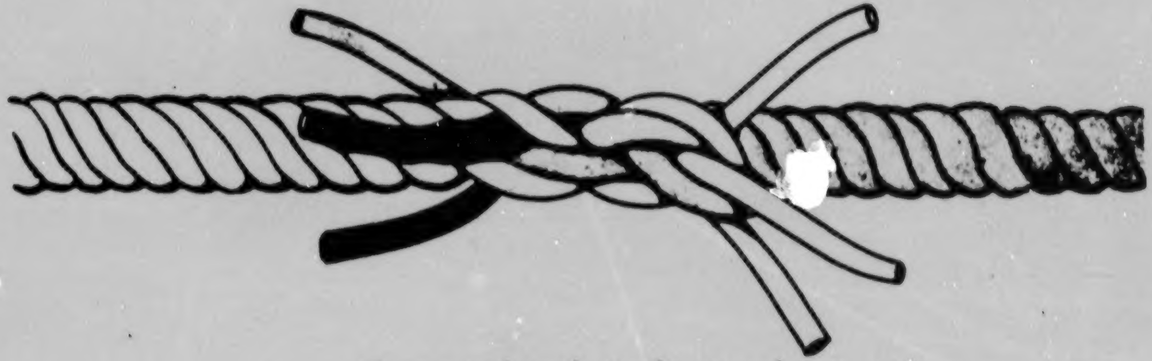
1. Unlay five (5) to seven (7) turns of the two pieces of rope to be spliced together.	1. Keep the ends from fraying.
2. Place the two ends together.	2. a. Being sure to guide the ends into each other so they will lock into one another. b. Using a cord tie the rope where they join. c. Make sure there is a strand between each other.
3. Begin tucking #1 strand under first lay of rope.	3. Work one side for three (3) tucks before starting the other side.
4. Tuck #2 strand under following lay of rope.	4. Pull this strand tight.
5. Tuck #3 strand under following lay of rope.	5. This completes first turn.
6. Follow steps 3, 4, and 5 under back splice in opposite direction and tighten splice when finished.	6. Tighten splice by rolling it.

Untwist seven turns at end of each rope and place ends together



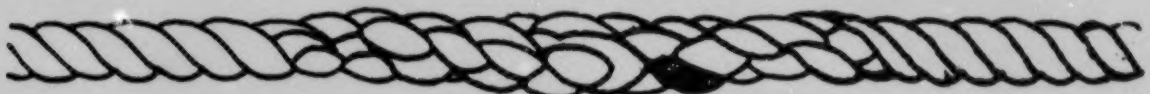
Each strand between two strands of the opposite end

Make first tuck under nearest strand



Cross and tuck each strand at nearly right angles

Divide each strand into two parts and take two or more tucks with each half strand



Cut off all loose ends and roll on hard surface

Figure 55. *Short splice.*

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LONG SPLICE

1. Unlay 15 turns on both ends of rope.	1. Keep ends from fraying.
2. Bring end together as in short splice.	2. a. Being sure to guide the ends into each other so they will lock into one another. b. Make sure there is a strand between each other.
3. Unlay one strand and lay in its place a strand of the other rope.	3. a. Make sure to pair the strands. b. Make sure to leave enough of the replacement strands to secure it (4 to 5 turns).
4. Beginning at point where two strands come together, unlay one of the strands to the right and lay corresponding strand in its place.	4. a. Secure the end of both strands by making a overhand knot. b. Make sure knot lock both ends and is flat in turn of rope.
5. Take next corresponding strand in opposite direction and feed it into turn of rope.	5. a. Be sure the ends of the strand in each pair pass each other. b. Make a overhand knot and tighten it into lay of rope.
6. Take the two remaining strands at center and make an overhand knot.	6. Make sure the knot fits into the lay of the rope.
7. Feather all ends.	7. Wax and trim all ends.
8. Roll the splice.	8. This rolling will tighten the splice.

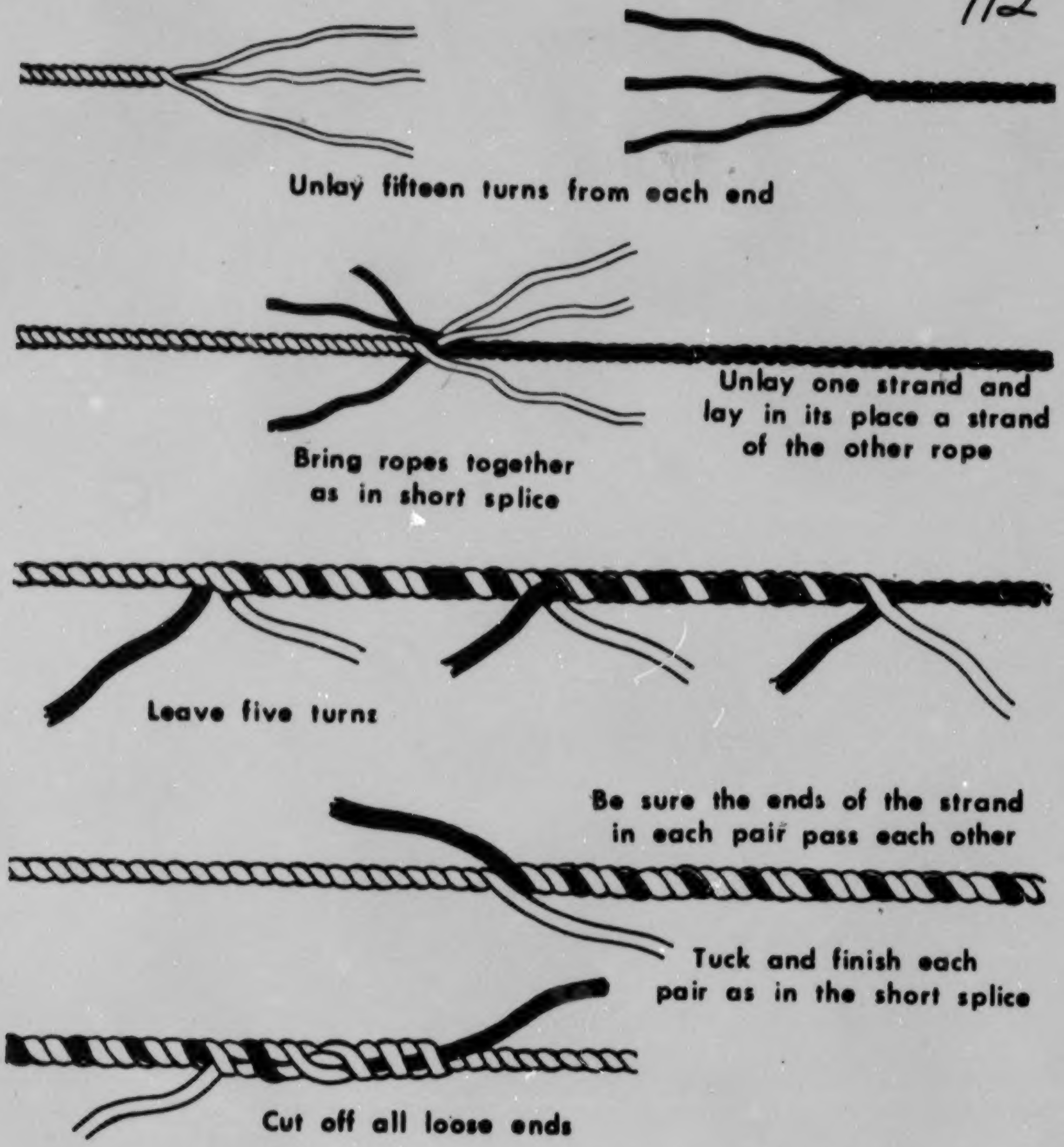
Unlay fifteen turns from each end
Bring ropes together as in short splice
Unlay one strand and lay in its place a strand of the other rope
Leave five turns
Be sure the ends of the strand in each pair pass each other
Tuck and finish each pair as in the short splice
Cut off all loose ends

Figure 56. *Long splice.*

U. S. ARMY QUARTERMASTER SCHOOL
PERFORMANCE EXAMINATION GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: B-7 Nomenclature, Inspection, Hand Repair Methods

INSTRUCTIONAL UNIT: Hand Repairs Examination

TYPE: Examination

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Tool kit, 3/4" Grommet ring, Cutter, Sailmaker's needle, Sailmaker's palm, Sewing cord, Beeswax, Lead block, Rawhide mallet, Canvas material, and Rope

TRAINING AID: Sample of finished test product

REFERENCES: FM 10-16, General Repair of Tents, Canvas, and Webbing, April 74, Sections II and IV; TM 5-725, Rigging, Oct 68, Chap 2; QMS 244.W1, Canvas and Webbed Repair, Part I, Sections VIII and XII; VT 760-101-0283B, Handworked Grommets; VT 760-101-0284B, Whipping and Splicing Ropes, Knotting and Hitches

STUDENT UNIFORM AND EQUIPMENT: Fatigues and all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

EXAMINATION TITLE: Hand Repairs Examination

YOUR OBJECTIVE: Giventool kit, 3/4" grommet ring, cutter, sailmaker's needle, sailmaker's palm, sewing cord, beeswax, lead block, rawhide mallet, canvas material, rope and appropriate references, you are to be able to demonstrate your ability to construct a handworked grommet, splice a rope through the handworked grommet by means of an eye splice, and whip the end of spliced rope in accordance with standards prescribed in QMS 244.W1, Part I, Sec VIII and Sec XII; FM 10-16, Sec II and Sec IV; VT 760-101-0283B, Handworked Grommets; and VT 760-101-0284B, Whipping and Splicing Ropes, Knotting and Hitches.

INTRODUCTION: This exam is a performance exam, an exam designed to measure your ability to do job related tasks. You will be graded on your performance--the finished product--not on your ability to memorize facts and figures. Figures, however, will be important as they apply to work standards (for example, sewing a line the required distance from the end of the material). Since you will use manuals or reference materials on the job for which you're being trained, you may use your course workbook and any reference manual issued to you.

You will be allowed sufficient time to complete the examination. Thus, work only as fast as you need to perform the examination tasks, being certain to follow the standards stated in your reference materials and practiced in past classroom hours.

DIRECTIONS:

1. Step 1. Prior to Performing the Required Tasks:

   a. Collect the following materials:

      (1) Reference materials (workbook, manuals).

      (2) 3/4" Grommet ring.

      (3) Cutter.

      (4) Sailmaker's Needle No. 15.

      (5) Sailmaker's palm.

{6} Sewing cord.

{7} Beeswax.

{8} Lead block.

{9} Rawhide mallet.

{10} Material.

{11} Rope.

{12} Tool kit.

{If these items are not on hand, ask your instructor for them.}

b. Ask your instructor to show you the sample of how your work is to look when finished.

2. Step 2. Perform the Required Tasks:

a. First construct a 3/4" handworked grommet.

b. Next, using this grommet, splice a rope through the grommet by means of an eye splice.

c. Last, whip the end of the spliced rope.

3. Step 3. Following Tasks Performance:

a. Have the instructor evaluate your work.

b. If your work has not met required standards, your instructor will direct you to review the portion or portions on which you're having difficulty.

c. Your instructor must sign your student progression sheet before you can proceed to your next assignment.

CW-B-7 DS 716

U. S. ARMY QUARTERMASTER SCHOOL

Deviation Rating Sheet
for
HAND REPAIRS EXAMINATION

This deviation rating sheet is used to rate the student's performance on the Hand Repairs Examination {CW-B-7-PFS} and will be used in conjunction with the grade sheet {CW-B-7 GS}.

Refer to the grade sheet for scoring procedures.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

THIS DEVIATION SCALE SUPERSEDES QMS 244.12 DS DATED MAY 1972

Maximum Possible Score: 40 Minimum Passing Score: 28 (Based on 70% of Max.)	VALUE	ANY DEVIATIO"	1/16" PLUS	1/16" MINUS	1/8" PLUS	1/8" MINUS	1/4" PLUS	1/4" MINUS	ANY GREATER DEVIATION	
A. HANDWORKED 3/4" GROMMET RING	X	X	X	POINTS TO TAKE AWAY X	X	X	X	X	X	
1. Was 1/2" cutter used.	3	3								
2. Stitches started 1/8" from ring edge.	3		1	2					3	
3. Are ends secured at least 1/2".	8					2 ea	1 ea	3 ea	4 ea	
4. Stitched 1/8" apart	3		1	2					3	
5. Thread waxed & twisted	1	1								
6. 18 stitches around ring.	1	1								
7. Stitches flattened.	1	1								
B. EYE SPLICE	X	X	X	POINTS TO TAKE AWAY X	X	X	X	X	X	
1. Started with center strand	1	1								
2. Strands interlaced (over & under)	1	1								
3. Tucks used (3)	1	1								
4. Strands cut at an angle parallel with rope.	3	3								
5. Splice rolled.	1	1								
C. WHIPPING	X	X	X	POINTS TO TAKE AWAY X	X	X	X	X	X	
1. Cord waxed.	1	1								

	VALUE	ANY DEVIATION	1/16" PLUS	1/16" MINUS	1/8" PLUS	1/8" MINUS	1/4" PLUS	1/4" MINUS	ANY GREATER DEVIATION	
2. Whipped w/turn of rope.	1	1								
3. Whip locked in center.	1	1								
4. Each turn of whip pulled even w/no overlaps.	1	1								
5. Whip 1/2" from rope end.	3		1	1	2	2			3	
				POINTS TO TAKE AWAY						
D. GENERAL	X	X	X	X	X	X	X	X	X	
1. Care of equip & tools.	2	2								
2. Regard for safety.	4	4								
TOTAL POINTS	40									

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CW-B-7 DS

RAW SCORE CONVERSION CHART

RAW SCORE	PER CENT
40	10000
39	09750
38	09500
37	09250
36	09000
35	08750
34	08500
33	08250
32	08000
31	07750
30	07500
29	07250
28	07000
27	06750
26	06500
25	06250
24	06000
23	05750
22	05500
21	05250
20	05000
19	04750
18	04500
17	04250
16	04000
15	03750
14	03500
13	03250
12	03000

CW-B-7 GS
720

U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
HAND REPAIR EXAMINATION

STUDENTS' EXAMINATION OBJECTIVE: To demonstrate their ability to construct a handworked grommet by means of an eye splice and whip the end of a spliced rope.

DIRECTIONS:

1. Materials Required:
    a. Performance Examination Guide (CW-B-7 H1).
    b. Deviation Sheet (CW-B-7 DS)
    c. Examination Record Sheet (TRADOC Form 533 R).
    d. 3/4 inch Grommet ring.
    e. Cutter.
    f. Sailmaker's Needle No 15.
    g. Sailmaker's palm.
    h. Sewing cord (cotton size 10-4).
    i. Beeswax.
    j. Lead block.
    k. Rawhide mallet.
    l. Material.
    m. Rope.
    n. Tool kit.
    o. Previously prepared samples of the examination requirements.
2. Examination Tasks:
    a. Construct a 3/4 inch handworked grommet.
    b. Splice a rope through the grommet by means of an eye splice.
    c. Whip the end of the spliced rope.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES
OCTOBER 1974
THIS GRADE SHEET SUPERSEDES QMS 244.12 GS DATED MAY 1972.

3. Scoring Procedures:

a. Use Deviation Rating Sheet (CW-B-7 DS) to determine the student's performance on each item.

b. Enter each student's name at the top of each column.

c. Under each student's name, record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score (columns 34-38), locate the raw score (student's total points) on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (CW-B-7 DS). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Since this is the first exam to be submitted, have each student personally check to be sure that the social security number is correct.

e. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting.

f. File the grade sheet in the class record file for future reference checks within the Branch.

Maximum Possible Score: 40 Minimum Passing Score: 28 (Based on 70% of Max.)	VALUE	NAME OF STUDENT								
A. HANDWORKED 3/4" GROMMET RING	X									
1. Was 1/2" cutter used.	3									
2. Stitches started 1/8" from ring edge.	3									
3. Are ends secured at least 1/2".	8									
4. Stitched 1/8" apart.	3									
5. Thread waxed & twisted.	1									
6. 18 stitches around ring.	1									
7. Stitches flattened	1									
B. EYE SPLICE	X									
1. Started with center stran	1									
2. Strands interlaced (over & under)	1									
3. Tucks used (3).	1									
4. Strands cut at angle parallel with rope.	3									
5. Splice rolled.	1									
C. WHIPPING	X									

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		NAME OF STUDENT								
	VALUE									
1. Cord waxed.	1									
2. Whipped w/turn of rope.	1									
3. Whip locked in center.	1									
4. Each turn of whip pulled even w/no overlaps.	1									
5. Whip 1/2" from rope end.	3									
D. GENERAL	X									
1. Care of equip & tools	2									
2. Regard for safety	4									
TOTAL POINTS EARNED	40									

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U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
HAND REPAIR EXAMINATION
FR-H-7

STUDENTS' EXAMINATION OBJECTIVE: To demonstrate their ability to construct a handworked grommet by means of an eye splice and whip the end of a spliced rope.

DIRECTIONS:

1. Materials Required:
   - a. Learning Performance Guide (FR-H-7-PE1-1).
   - b. Deviation Sheet (FR-H-7-E2).
   - c. Examination Record Sheet (TRADOC Form 533 R).
   - d. 3/4 inch Grommet ring.
   - e. Cutter.
   - f. Sailmaker's Needle No 15.
   - g. Sailmaker's palm.
   - h. Sewing cord (cotton size 10-4).
   - i. Beeswax.
   - j. Lead block.
   - k. Rawhide mallet.
   - l. Material.
   - m. Rope.
   - n. Tool kit.
   - o. Previously prepared samples of the examination requirements.
2. Examination Tasks:
   - a. Construct a 3/4 inch handworked grommet.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES
MARCH 1976

THIS GRADE SHEET SUPERSEDES QMS CW-B-7-GS DATED OCTOBER 1974

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b. Splice a rope through the grommet by means of an eye splice.

c. Whip the end of the spliced rope.

3. Scoring Procedures:

a. Use Deviation Rating Sheet (FR-H-7-E2) to determine the student's performance on each item.

b. Enter each student's name at the top of each column.

c. Under each student's name, record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score (columns 34-38), locate the raw score (student's total points) on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (FR-H-7-E2). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Since this is the first exam to be submitted, have each student personally check to be sure that the social security number is correct.

e. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting.

f. File the grade sheet in the class record file for future reference checks within the Branch.

		NAME OF STUDENT								
Maximum Possible Score: 40 Minimum Passing Score: 28 (Based on 70% of Max.)	VALUE									
A. HANDWORKED 3/4" GROMMET RING	X									
1. Was 1/2" cutter used.	3									
2. Stitches started 1/8" from ring edge.	3									
3. Are ends secured at least 1/2".	8									
4. Stitched 1/8" apart.	3									
5. Thread waxed & twisted.	1									
6. 18 stitches around ring.	1									
7. Stitches flattened	1									
B. EYE SPLICE	X									
1. Started with center strand	1									
2. Strands interlaced (over & under)	1									
3. Tucks used (3).	1									
4. Strands cut at angle parallel with rope.	3									
5. Splice rolled.	1									
C. WHIPPING	X									

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	VALUE	NAME OF STUDENT								
1. Cord waxed.	1									
2. Whipped w/turn of rope.	1									
3. Whip locked in center.	1									
4. Each turn of whip pulled even w/no overlaps.	1									
5. Whip 1/2" from rope end.	3									
D. GENERAL	X									
1. Care of equip & tools	2									
2. Regard for safety	4									
TOTAL POINTS EARNED	40									

RAW SCORE CONVERSION CHART
For
HAND REPAIR

RAW SCORE	PERCENT
40	10000
39	09750
38	09500
37	09250
36	09000
35	08750
34	08500
33	08250
32	08000
31	07750
30	07500
29	07250
28	07000
27	06750
26	06500
25	06250
24	06000
23	05750
22	05500
21	05250
20	05000
19	04750
18	04500
17	04250
16	04000
15	03750
14	03500
13	03250
12	03000

QMS 244.13 L/PG

U. S. ARMY QUARTERMASTER SCHOOL

LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-1 Operator's Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Introduction to Sewing Machines

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Sewing machines (Models: Heavy duty, Medium Duty, Light Duty, and Darners), Video cassette player set, and Video cassette tape VT 760-101-0298B.

TYPE: Television and Practical Exercise 1

TRAINING AIDS: VT 760-101-0298B, Introduction to Sewing machines; QMS 244.W1, Part I, Section XIII; Sewing machines (Models: Heavy duty, light duty, medium duty, and darner)

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Par's 6-20, QMS 244.W1, Canvas and Webbed Equipage Repair Course, August 1972, Part I, Section XIII, Pages 13.01-13.22; and VT 760-101-0298B

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Section XIII, Pgs. 13.01-13.22.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

DECEMBER 1974

[illegible] 1975

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LESSON TITLE: Introduction to Sewing Machines

YOUR OBJECTIVE: As a result of this instruction, given appropriate references, sewing machines (Models: heavy duty, medium duty, light duty, and darning machines), video cassette player set, video cartridge VT 760-101-0298B, and this student learning and performance guide, you will be able to choose the machine model in relationship to the material to be sewn, locate by name the operator's controls of canvas and webbed equipage sewing machines (Models heavy duty, light duty, medium duty, and darner) in accordance with standards prescribed in TM 10-3530-203-10, Para's 6-20; QMS 244.W1, Part I, Section XIII; and VT 760-101-0298B, Introduction to Sewing Machines.

INTRODUCTION: There are approximately 4,000 different sewing machines on the market. Each of these machines is designed to do a specific job or task. While you will only use a few different types in the Canvas and Webbed Equipage Repair Course, you, as an operator, must be able to select the correct machine with which to sew an item. While heavy duty sewing machines are used to sew heavyweight canvas, light duty machines are used for sewing clothing items and other lightweight items. In order to operate these machines, you must know where the controls are and what each control is designed to do -- for example, the lifting lever allows you to raise the presserfoot to insert the material into the machine.

DIRECTIONS:

1. Working at your own pace, you are to watch the film (VT 760-101-0298B), Introduction to Sewing Machines, then fill out the questionnaire that follows.

CIRCLE THE LETTER OF YOUR CHOICE:

a. Where on the Model 7-33 Sewing Machine is the balance wheel located?

A. Face of the machine.

B. Right end of the motor.

C. Right end of the arm.

D. On the treadle assembly.

b. The tension on the needle thread is controled by the:

A. feed dogs.

B. lifter lever.

C. tension assembly.

D. stitch regulator.

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c. For the light duty sewing machine, the material is feed through the machine be:

A. presser foot.

B. feed dogs.

C. stitch regulator.

D. operator.

d. The material on the darning machine is feed through the machine by:

A. feed dogs.

B. presser foot.

C. operator.

D. tension assembly.

e. The shuttle assembly on a sewing machine is located in the:

A. face assembly.

B. bed assembly.

C. treadle assembly.

D. motor assembly.

2. After you have answered all the questions, ask your instructor to check your answers.

3. Upon completion of the exercise, your instructor will sign your student progression sheet and assign you to the next lesson.

SECTION XIII

INTRODUCTION TO SEWING MACHINES

I. Purpose and Scope.

The instruction in this section will enable you to identify each sewing machine by name and model number (heavy duty, 7-33; light duty, 3-31K1; medium duty, 211G155; darner, 47W70; and overedger, 460-12); describe the operating features of each machine by stating the types of work each machine is designed to sew; locate and name the major assemblies of each machine; locate and describe the operator controls by stating the purpose of the motor switch, motor clutch pedal, knee lifter, hand lifting lever, starting lever treadle, and foot lifter treadle. You will also be able to indicate the appropriate class and variety of needle used with each sewing machine; distinguish between the various sizes of thread, in accordance with the thread codes; determine the left or right twist of thread; and select the appropriate combination of needles and thread sizes.

II. References.

TM 10-3530-203-10

TM 10-3530-203-24

NOTE TO STUDENTS:

This section contains the introduction of canvas and webbed repair

733 sewing machines. Listed below to the left of the page are the sewing machine models that will be discussed in this section. To the right of the page are the related models which you may encounter in the Army as canvas repairmen. However, regardless of the model with which you encounter, you will find that the operator maintenance, adjustments, and operation procedures will have very little differences.

Models	Related Models
331K1; 331K4 (Light Duty Machine)	31-15
47W70 (Darning Machine)	-----
246-K-42; 246-K-43; 246-K45; 460-12 thru 22 (Overedger)	246-5
211G155; 211G156 (Medium Duty)	111G155
7-33 (Heavy Duty)	-----

III. Review.

In the beginning of the course you received instruction on the Army Maintenance System, and what part you play in the maintenance program. For you to prepare and maintain your equipment it will be necessary to know the operating features, tabulated data and operator's controls of canvas and webbed sewing machines. In this section you will be taught the characteristics and function of the major assemblies and operation controls. This knowledge will better prepare you as a canvas repairman and increase your ability to perform in the sections to follow. In the machine maintenance phase, you will notice that the supplies and tools are not always listed. They will only be listed when they differ from the ordinary. In such case, use the standard issues of screwdrivers, oil, cleaning rags and sewing materials.

IV. Introduction to Machines.

A. Light Duty Sewing Machine. (Fig 57 and 57A)

1. Description.

a. The light duty sewing machine consists of an alternating current motor: a machine head and sewing stand.

b. The motor is bolted to the underside of the stand top and the machine is run by a 1/4 inch round leather belt, and has a clutch and brake assembly.

c. The head is composed of the bed, the arm, and the balance wheel. The bed casting supports the arm assemblies and contains the driving or oscillating shaft, the shuttle race assembly, and the feeding assemblies.

d. The arm is a housing which contains the upper driving assembly and supports the face assemblies.

e. The face assemblies are the needle bar, presser bar and the thread take-up assemblies.

2. Operating features.

a. The light duty sewing machine is used for general duty or tailoring work.

b. The oscillating shuttle carries a round bobbin and sews a lock stitch.

c. The presser foot may be raised by either the hand lifting lever or the knee lifter, the hand lifting lever locks the presser foot in its raised position. While the machine is stitching, the presser foot must be down, this will hold the material in contact with the feed dog.

d. The feed dog moves up and away from the operator on each upstroke of the needle bar.

e. The machine may be used for darning, if the operator uses the hand lifting lever or the knee lifter to raise the presser foot just enough to allow him to move the material back and forth under the needle.

3. Tabulated data.

a. The working space of the light duty sewing machine is 10 1/4 inches.

b. The maximum speed is 2,200 stitches per minute.

c. The length of stitches is from seven (7) to thirty-two (32) stitches per inch.

4. Operator's Controls.

a. A toggle or push switch is located on the left side of the machine stand.

b. Motor clutch pedal. The motor is connected to the motor driving pulley by a clutch, which is operated by the pedal or foot treadle. To connect the motor with the machine, press this pedal. If the brake on the clutch does not stop the machine promptly, it may be adjusted for a closer fit.

c. Knee lifter. The presser foot can be raised by operating the knee lifter to the right. This knee lifter connects with a knee lifting lever on the bottom of the head of the machine. A knee lifting lever push rod runs up and behind the arm of the machine to the presser foot.

d. Hand lifting lever. The presser foot may also be lifted and locked in its raised position by raising the hand lever to its highest position. After the presser foot has been locked in its raised position, it may be released by pressing the knee lifter to the right.

e. Stitch adjusting screw. The feed regulator thumb screw on the front side of the arm regulates the length of the stitch. To measure the number of stitches being sewn to the inch, draw two parallel lines one inch apart on a small piece of cloth, sew across these lines and count the number of stitches between them. To change the length of stitch, loosen the regulator thumb screw and move it down to lengthen the stitch, and up to shorten the stitch. When the desired length is being sewn, tighten the regulator screw.

5. Needle class and variety.

a. The size of the needle to be used is determined by the size and type of the thread used and type of material to be sewn. The thread must pass freely through the eye of the needle. Rough or uneven thread, or thread which for any reason does not pass easily through the eye of the needle interferes with the operation of the machine.

b. Requisition for needles must specify the number of needles desired, the class number and the variety number are expressed by placing the letter "X" between the numbers, Class 16, Size 18, 16x87" needles. The class number describes the shank of the needle, and the variety number describes the length of the needle and the type of the point. The size describes the gauge of the needle and the needle eye.

c. The light duty sewing machine requires a class 16, variety 87, needle. The size we use here at the school is 18, listed as the following 16x87, size 18.

6. Thread twist and codes.

a. Because right-twist thread unwinds and breaks in a machine needle, left-twist thread should be used for the needles of this machine.

b. To determine the twist of the thread, hold the end of the thread between the thumb and forefinger of the left hand, and with the thumb and forefinger of the right hand, twist about an inch of the thread toward you. If the thread is left-twist, the strands will wind together; if the thread is right-twist, the strands will unwind.

c. There are a variety of thread classes and sizes used in the repair of canvas and webbed items. At the time of this writing it was noted that there are two types in the supply system. Listed below are the newly adopted threads to be used, also listed are the threads being replaced.

	NEW THREAD (DESCRIPTION)	THREAD BEING REPLACED
1.	Thread: polyester, class 2, size E, natural, Mil-T-40040 bonded finish.	replaces thread size 24/4.
2.	Thread: polyester, class 2, size F, natural, Mil-T-40040 bonded finish.	replaces thread size 16/4.
3.	Thread: polyester, class 2, size FF, natural, Mil-T-40040, bonded finish.	replaces thread sizes 10/3 and 12/4.

d. Requisition for thread should state the Federal Stock Number, Description and Quantity of Issue for example: (8310-988-1297 Thread: polyester, class 2, size E, natural, Mil-T-40040, bonded finish 25 TU).

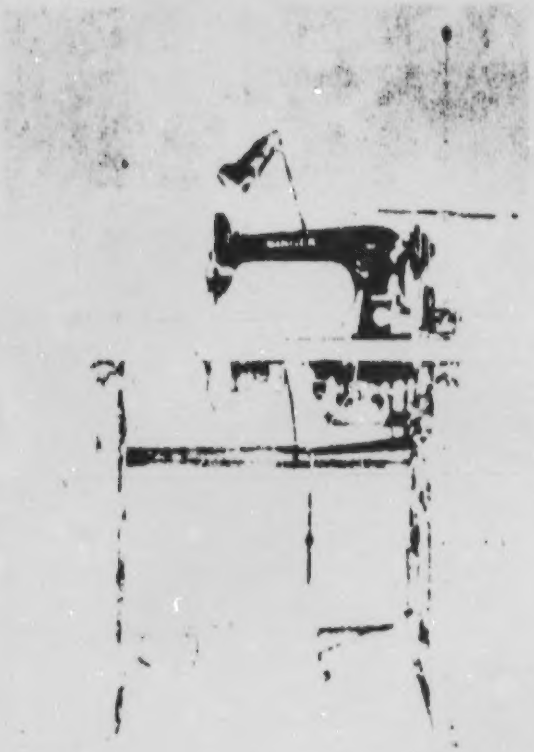
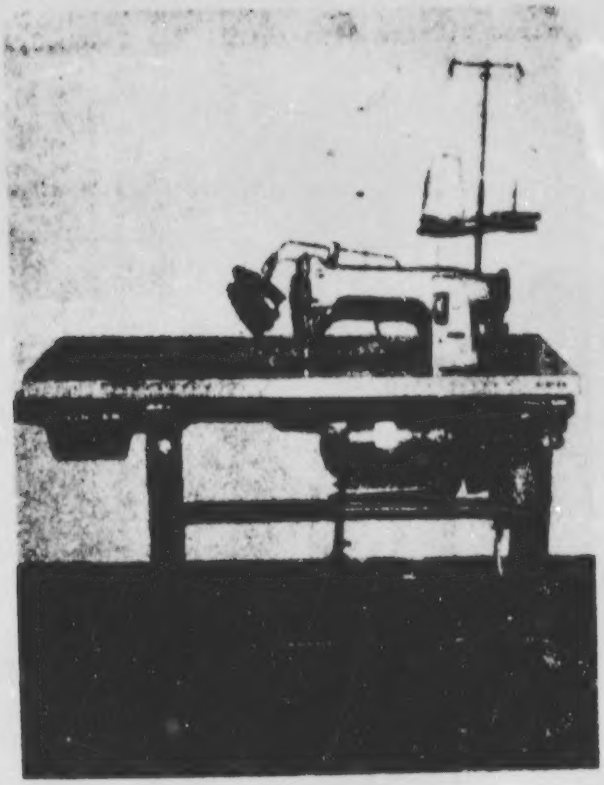


Figure 57. Model 31-15 machine, of which there is one used on mobile trailer.



(Light Duty Sewing Machine)

Model 331K1

Figure 57A

B. Darning Machine. (Fig 58 and 58A)

1. Description and operating features.

a. The darning machine has a tubular bed which is especially useful in darning sleeves, legs of trousers, and similar tubular articles of clothing not easily reached by a flat bed machine.

b. With its needle and rotary sewing hook, similar to that in the medium duty sewing machine, it sews a lock stitch. It has no feeding mechanism, the operator moves the work back and forth under the needle. Because the presser foot rises with each upstroke of the needle, the operator can move the work freely in any direction without operating the knee lifter.

c. The knee lifter is used to take tension off the thread when the operator is taking work out of the machine or changing the area of darning.

2. Tabulated data (Darning Machine).

a. The bed is 2 1/2 inches in length.

b. The base is 1 5/8 inches high.

c. The maximum speed is 2,800 revolutions per minute.

3. Operator's Controls.

a. Motor Switch (Same as light duty).

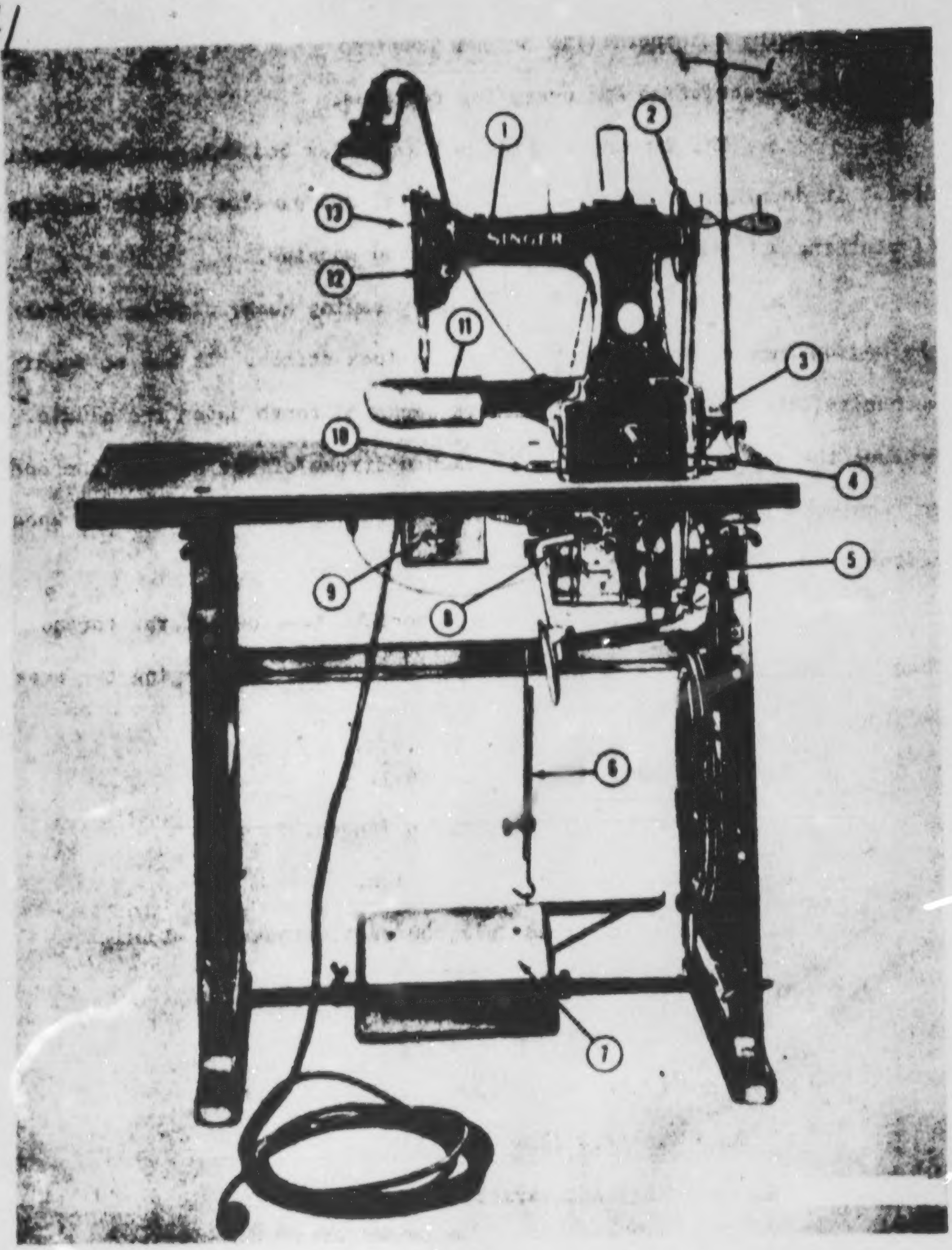
b. Motor Clutch Pedal (Same as light duty).

c. Knee lifter. (Same as light duty).

4. Needles, class and variety.

a. The needles for the darning machine are class 126, variety 3, sizes 10 through 24.

b. To be ordered as follows: (126x3 size 18).


1
2
13
SINGER
12
11
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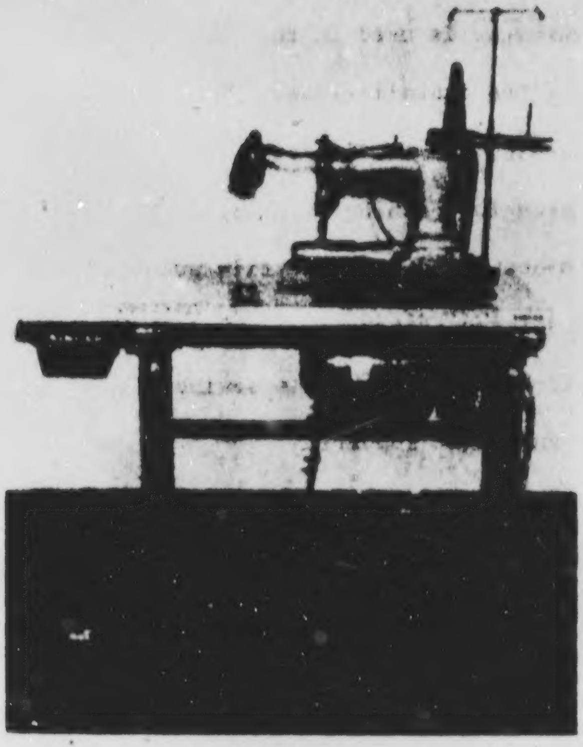
7

1 Arm, machine
2 Pulley with balance wheel, drive
3 Winder, bobbin
4 Clamp, bed
5 Clutch assembly
6 Rod

Fig 58 DARNING MACHINE FRONT VIEW



(Darning Machine)

Figure 58 A

743 c. Overedging Machine. (Fig 59 and 59A)

1. Description and operating features.

a. The overedger is used in the textile repair shop (trailer mounted) as well as in fixed installations. This machine has a differential feed, a trimmer, one needle, and two loopers.

b. The overedging machine is designed for simultaneous trimming and stitching of medium-heavy and heavy textile goods with the type 504, or three-thread tight overedge stitch.

c. The stitch is formed by the sewing needle working in conjunction with the left and right loopers.

d. The trimmers work ahead of the needle and loopers, and will cut the cloth smoothly and at a sufficient distance from the point of penetration of the needle to permit the formation of a secure stitch.

2. Tabulated data. (Overedger)

a. Number of threads, three (3).

b. Speed (stitches per minute 5,000 maximum, 4,500 long runs).

c. Maximum thickness of material 1/4 inch.

3. Operator's Controls.

a. Motor Switch (Same as light duty).

b. Motor Clutch Pedal (Same as light duty).

c. Knee lifter. (Same as light duty).

4. Needles, class and variety.

a. The needles for the overedging machine are class 151, variety 1, standardization for military use has been made on sizes 16 and 18. This is a curved needle.

b. To be ordered as follows (151x1 size 18).

744

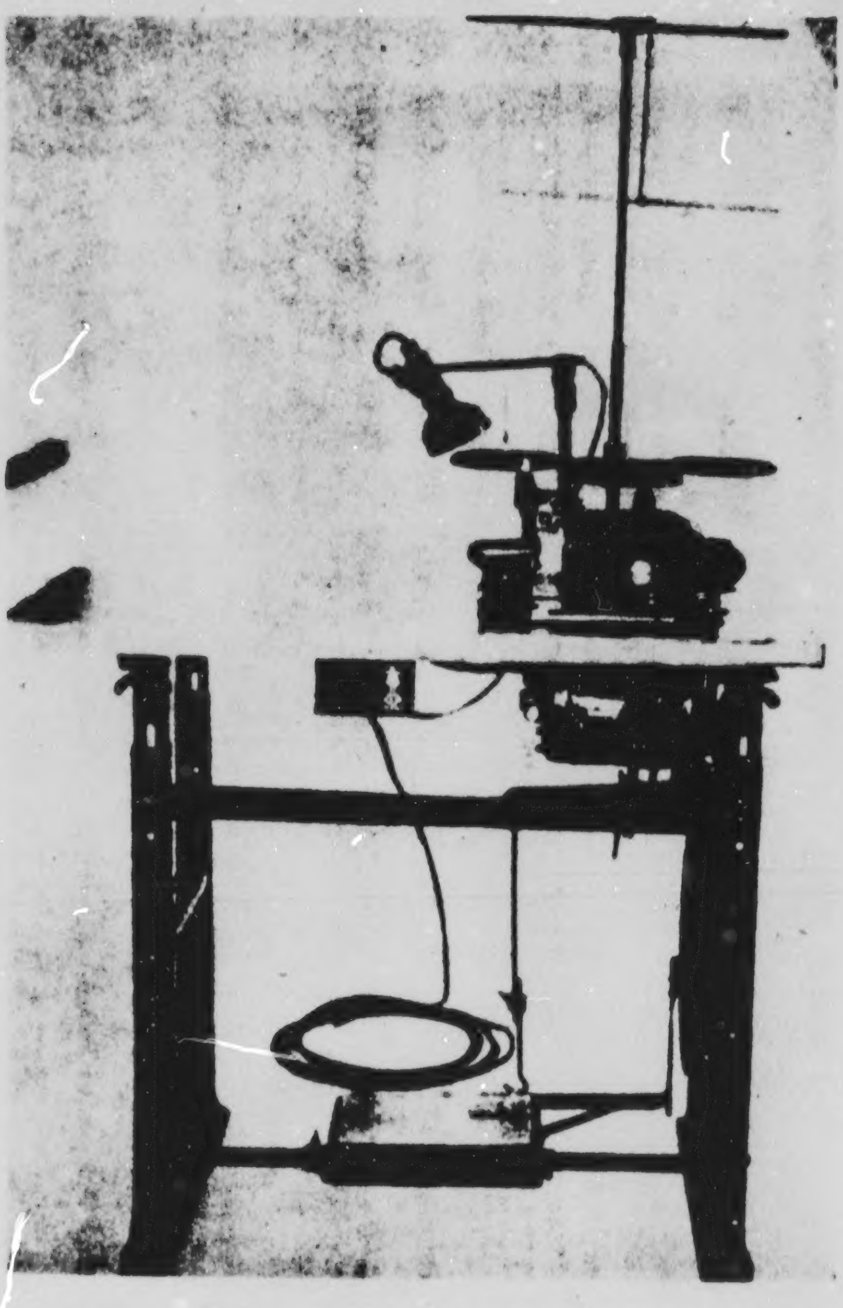
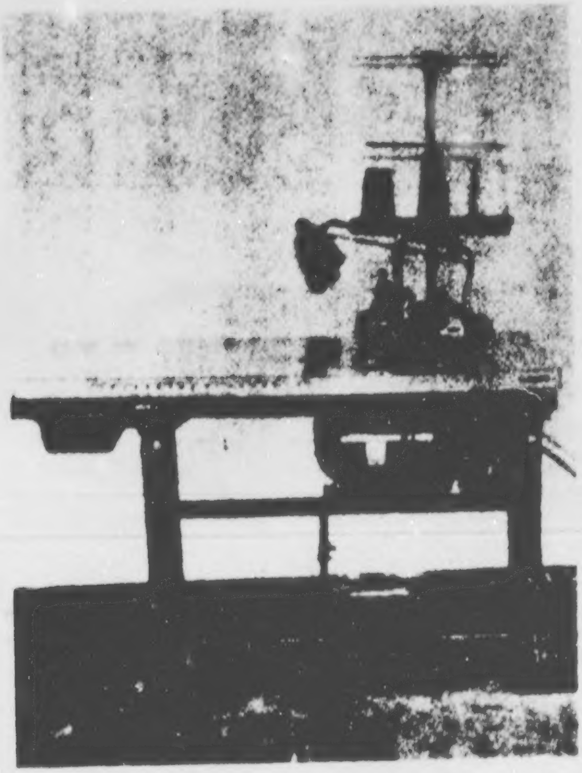


Figure 59 MODEL 246-5 MACHINE, USED ON MOBILE TRAILER

164



(Overedger)

Model 460-15

Figure 59 A

D. **Medium Duty Sewing Machines.** (Fig 60 and 60A)

1. Description.

a. The medium duty sewing machine consists of three major assemblies: the head, stand, and motor.

b. The head is composed of the horizontal arm, vertical arm, or face, and the base.

c. The motor is bolted to the underside of the stand top and is belted to the machine by a "V" type belt.

2. Operating Features.

a. The medium duty machine is used for sewing lightweight to medium-heavy canvas and webbed items, such as field packs, vehicle seat covers, and furniture upholstery.

b. The sewing hook acts as a shuttle of the light duty sewing machine. The sewing hook picks up the thread for the needle and passes it around the bobbin thread to form a lockstitch.

c. The front or vibrating foot and the feed dog move in unison. Together they move the cloth away from the operator with each upstroke of the needle. The back foot, or presser foot, holds the fabric while the vibrating presser foot rises and moves forward. Because of this moving action of the presser feet, no backstitching or darning can be done effectively on this machine.

3. Tabulated Data.

a. The working space of the medium duty sewing machine is 10 1/2".

b. The maximum speed is 3500 stitches per minute.

c. The length of stitches the machine can sew range from 3 1/2 to 32 stitches per inch.

4. Operator's Controls.

a. Motor Switch - The toggle type motor switch is located at the front of and the underside of the table top. It is used for starting and stopping the motor.

b. Treadle - The treadle is located at the bottom of the stand. It is used to operate or to engage the clutch. Press it downward to engage the clutch and to start the machine to operate at a low speed. Press it harder for a high speed. Release the treadle to disengage the clutch or to stop the machine.

c. Presser bar lifter - The presser bar lifter, located behind the face assemblies is used to lower and raise the presser foot.

d. Knee lifter - The knee lifter attached to the underside of the table top, is located in front of the motor. It is used to raise and to lower the presser foot and to release the tension on the thread.

5. Needle Class and Variety.

a. Select the needle of the correct size and according to the type of thread and weight of material to be used for sewing.

b. The thread must pass freely through the eye of the needle. Rough or uneven thread or thread which for any reason does not slip easily through the needle will interfere with the operation of the sewing machine.

c. The class number (135) and the variety number (17) are expressed by placing the letter X between the two numbers, for example, 135x17 needles. The class number describes the shank of the needle, the variety number describes the length.

6. Thread Weight - The left-twist thread must be in the needle, but right-twist thread may be used on the bobbin.

748

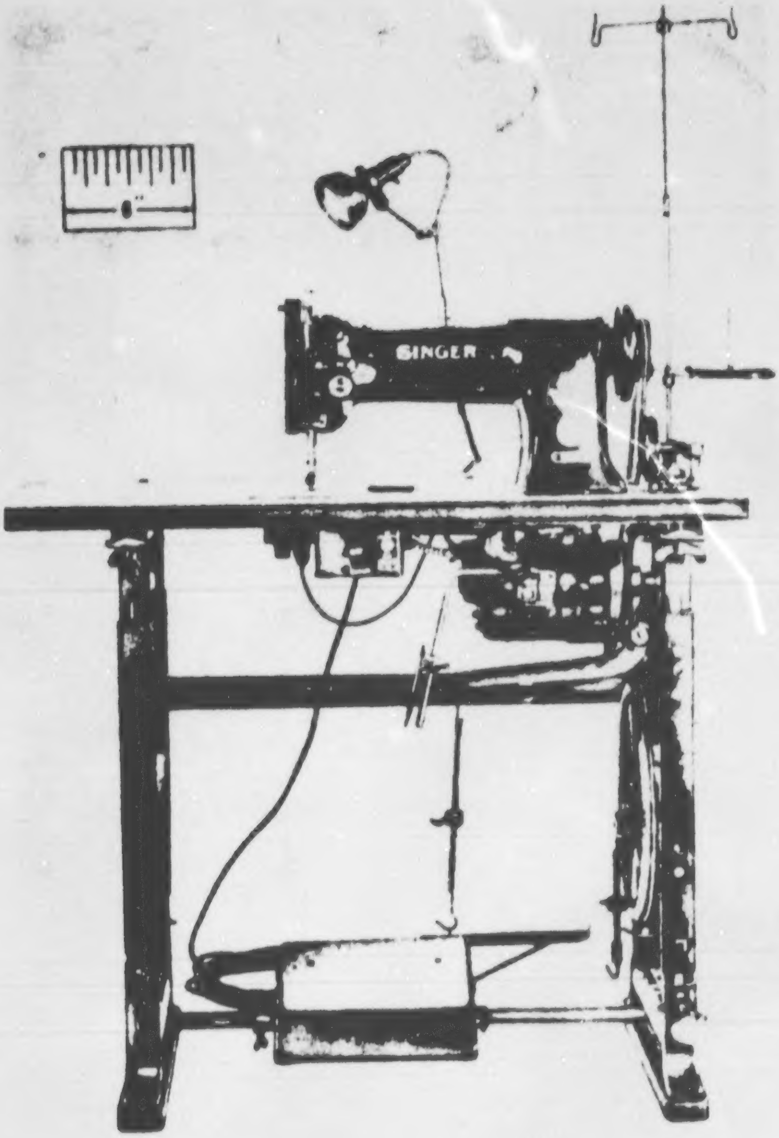


Figure 60. Model 111x155 machine, of which there are two, used on mobile trailer.

188

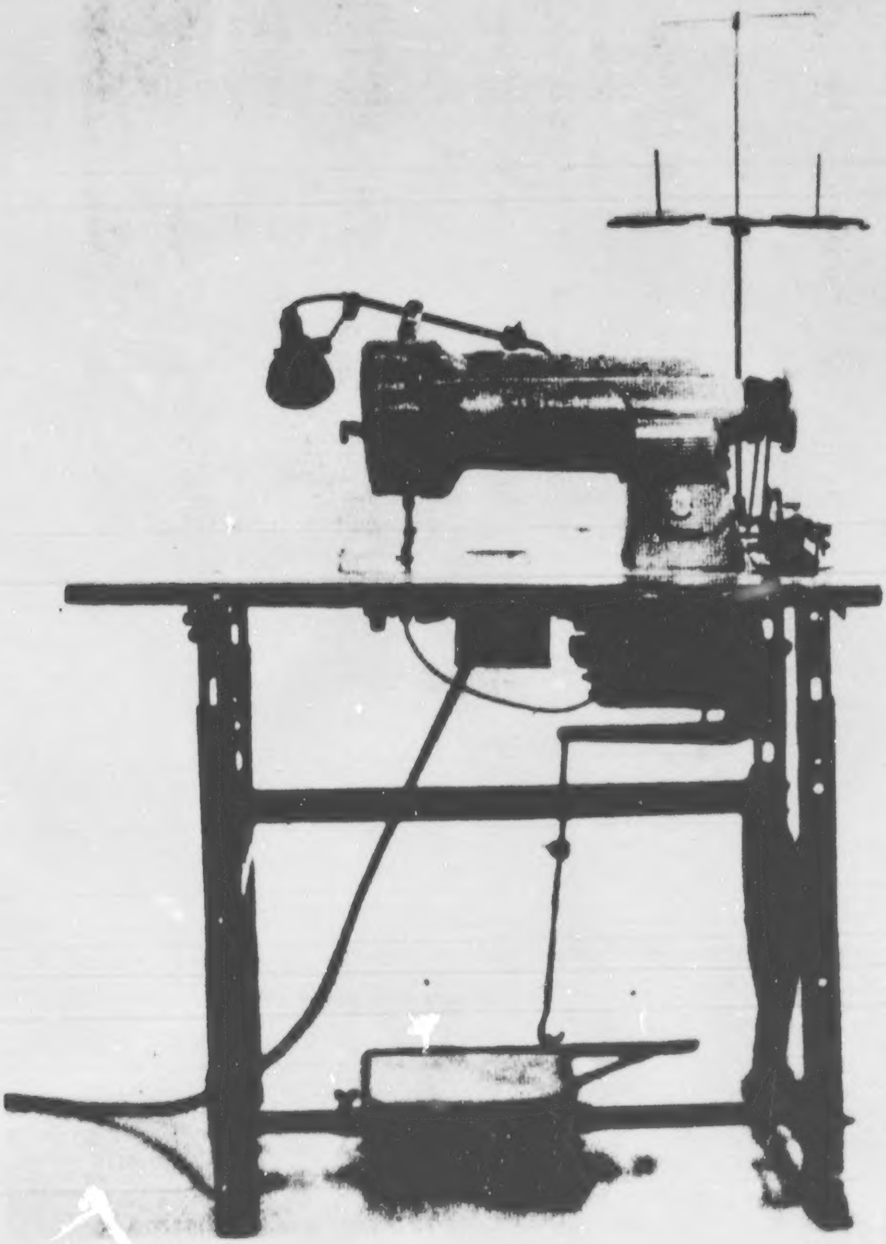


Figure 60 A (Medium Duty Sewing Machine)
Model 211G155

E. Heavy Duty Machine. (Fig 61 and 61A)

1. Description.

a. The heavy duty machine consists of three major assemblies, the head, the motor, and stand.

b. The head consists of the horizontal arm, the vertical arm or face and the base.

c. The stand consists of the wooden top, legs and braces.

2. Operating Features.

a. The heavy duty machine sews a fixed or locked stitch which will not unravel.

b. The heavy duty sewing machine is used to sew heavy canvas and webbed items, and tentage.

c. It has an oscillating shuttle which swings back and forth like the pendulum of a clock.

3. Tabulated Data.

a. Working space 15 7/8 inches.

b. The maximum speed is 550 stitches per minute.

c. The length of stitch the machine can sew range from 2 to 8 stitches per inch.

4. Operator's Control.

a. Motor switch - The motor switch is located at the front and on the underside of the tabletop.

b. Treadle - The treadle is located at the bottom of the stand. It is used to operate the clutch and brake assembly that connects the motor driving pulley.

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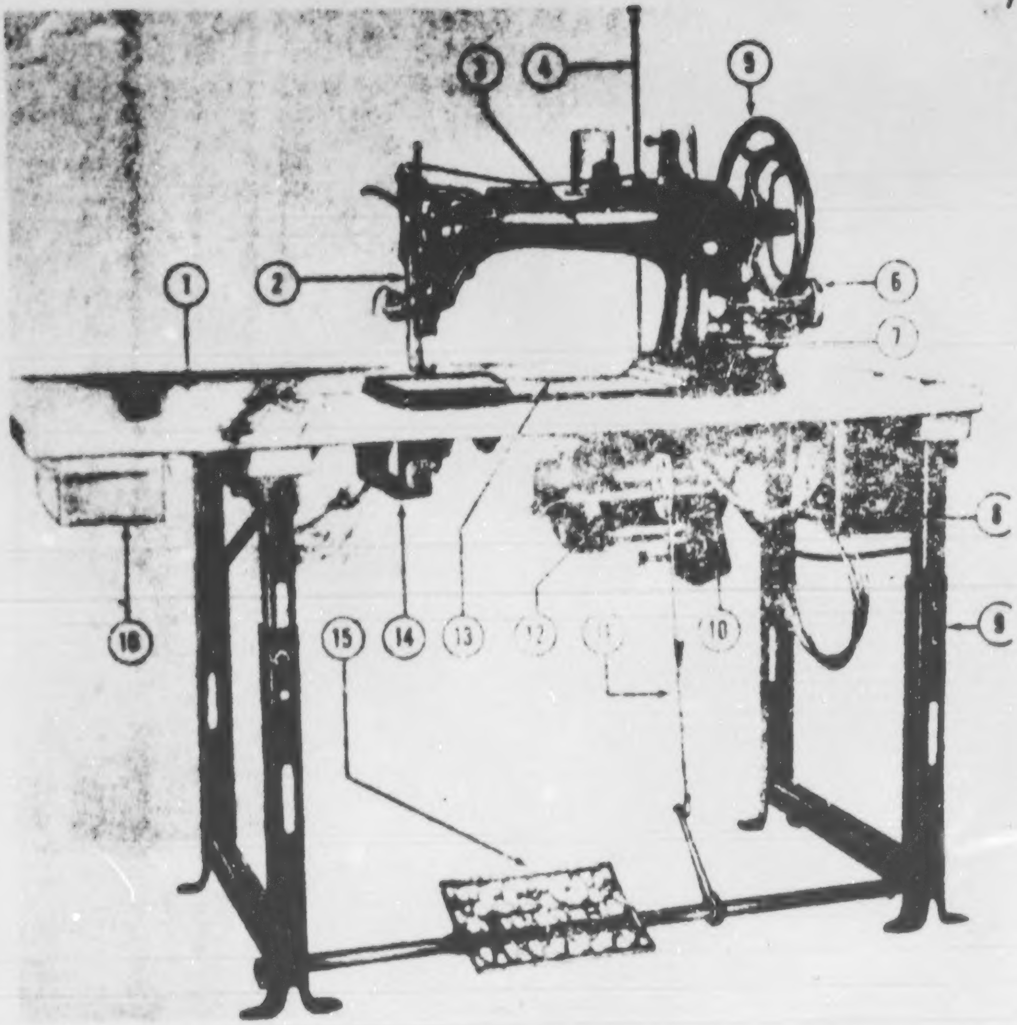
c. Presser bar lifter - The presser bar lifter located behind the machine face assemblies, is used to raise and to lower the presser foot.

d. Adjusting Nut - The adjusting nut located on the motor mounting bracket under the tabletop, is used to adjust the tension of the round belt.

5. Needle - Select needle of the correct size according to the type of thread and weight of material to be used. The class number (7) and the variety number (1) are the proper class and variety; example 7x1 needles. The class number describes the shank of the needle, the variety number describes the length.

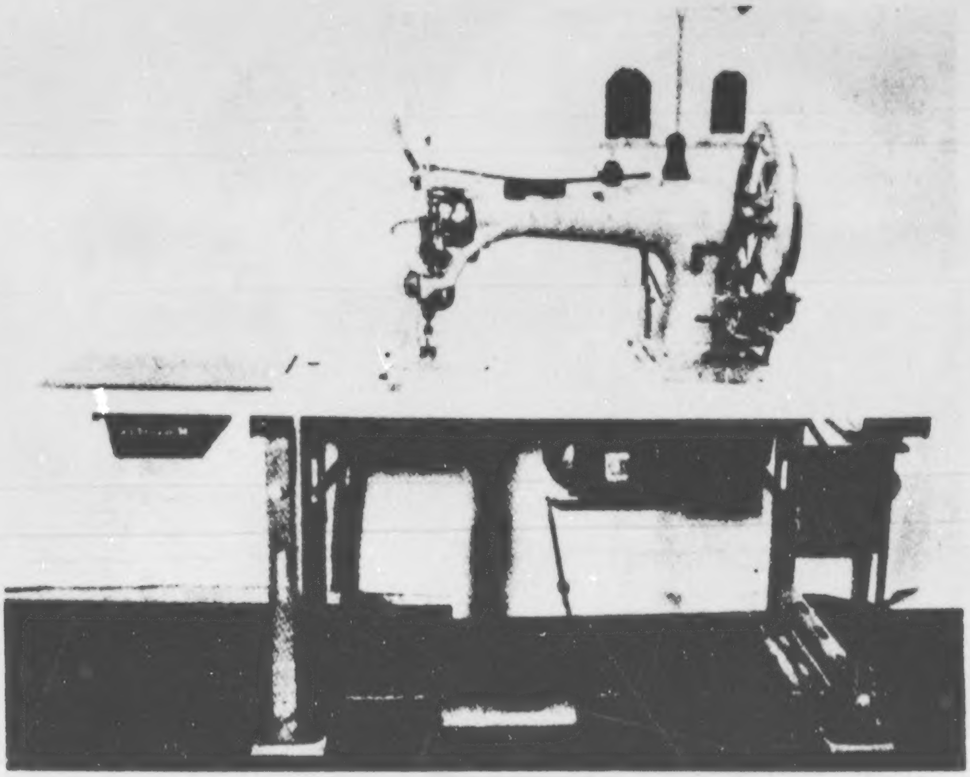
6. Thread - Left-twist thread must be used in the needle. The thread must pass freely through the eye of the needle, rough or uneven thread interferes with the operation of the machine.



1. Stand top
2. Face assemblies
3. Horizontal arm
4. Thread stand
5. Balance wheel
6. Bobbin winder
7. Model number plate
8. Switch box
9. Stand legs
10. Motor clutch pulley
11. Pitman rod
12. Motor
13. Machine bed
14. Bridle iron
15. Foot treadle
16. Tool drawer

Figure 61 Heavy-duty sewing machine, Model 7-33, front view.

753



(Heavy Duty Sewing Machine)

Model 7-33

Figure 6I A

U. S. ARMY QUARTERMASTER SCHOOL

LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-2 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Operator Maintenance of Sewing Machines; Maintenance Forms

TYPE: Television, Practical Exercise Hardware, and Practical Exercise Classroom

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Heavy duty sewing machine, Medium duty sewing machine, Light duty sewing machine, Darning machine, DA Form 2404, Lubricants, Video cassette player set, VT 760-101-0295B, and QMS 244.14 L/PG Student Learning and Performance Guide

TRAINING AIDS: Heavy duty sewing machine, Medium duty machine, Light duty machine, Darning machine, DA Form 2404, Cassette tape VT 760-101-0295B Operator Maintenance of Canvas Repair Sewing Machines; Maintenance Forms

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Para 51-56; VT 760-101-0295B, Operator Maintenance of Canvas Repair Sewing Machines; Maintenance Forms; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Sections XIX, XXIII, and XXVIII.

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part I, Sections XIX, XXIII, and XXVIII, Pgs 14.01-14.17, 19.01-19.17, 23.01-23.12, and 28.01-28.21.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

DECEMBER 1974

LESSON TITLE: Operator Maintenance of Sewing Machines; Maintenance Forms

YOUR OBJECTIVE: As a result of this instruction, given learning and performance guide, QMS 244.14 L/PG; appropriate references; heavy duty, medium duty, light duty, and darning machines; DA Form 2404; lubricants; cassette tape player set; and tape VT 760-101-0295B, you will be able to perform operator's preventive maintenance services and use DA Form 2404 in performing operator's maintenance on canvas repair sewing machines in accordance with standards prescribed in TM 10-3530-203-10; VT 760-101-0295B; and QMS 244.W1, Part I.

INTRODUCTION: Preventive maintenance includes all actions taken by an operator to prevent breakdown or malfunctioning of equipment. Unless this maintenance is performed on a regular schedule, breakdown will occur--causing production loss and resulting in costly repairs. Remember, oil is cheaper than machinery.

DIRECTIONS:

1. Watch VT 760-101-0295B, Operator Maintenance of Canvas Repair Sewing Machines; Maintenance Forms.

2. Working at your own pace, clean and lubricate a sewing machine. Your instructor will assign you to the machine you are to perform on. You will require the following tools, equipment, supplies, and materials:

a. Sewing machine. (assigned by your instructor)

b. Solvent compound.

c. Sash brush.

d. Tool kit.

e. Rags.

f. Lubricants.

g. DA Form 2404.

h. TM 10-3530-203-10 and QMS 244.W1, Part I.

3. After cleaning the machine, select the appropriate lubrication order from TM 10-3530-203-10 and lubricate all numbered items in sequence. Start at item one (1) and proceed in numerical order until the machine has been properly lubricated.

4. If you experience any problems, ask your classroom instructor to explain the correct procedures.

5. After the machine has been cleaned and lubricated, fill out DA Form 2404 with the required information. Use the serial number from the machine your instructor has assigned you to.

6. Your classroom instructor will check your DA Form 2404 after it has been filled out. If the form is not filled out correctly, he may require you to repeat a portion of the exercise.

7. Follow all fire and safety rules during this exercise. Be sure the motor switch is in the off position. Do not turn the motor on until the instructor gives his permission.

8. After you have completed this lesson, have your instructor sign your progression sheet. He will then assign you to your next lesson.

SECTION XIV

OPERATOR MAINTENANCE OF THE HEAVY DUTY SEWING MACHINE

MAINTENANCE FORMS

PRACTICAL EXERCISE

I. **Purpose and Scope.**

This instruction will enable you to lubricate the sewing machine with prescribed lubricant in accordance with appropriate service intervals and points of application specified on the lubrication chart contained in TM 10-3530-203-10 and TM 10-3530-203-24; be able to perform the "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards, and make appropriate entries on DA Form 2404. The purpose of maintenance is to continue the service life of the equipment in the hands of the user and for repair and return of material to the supply system to reduce the supplying of a much greater amount of equipment and machinery. It must be recognized, therefore, that supply and maintenance are dependent upon each other at each level of command and that a discussion of one automatically involves a discussion of the other.

II. References.

TM 10-3530-203-10
TM 10-3530-203-24
TM 38-750

III. Supplies, Tools and Equipment.

Heavy duty sewing machine
Oil can
Cleaning and lubricating material
DA Form 2404 (Equipment, Inspection, and Maintenance Worksheet)

IV. Performance Standards. Use these standards to check the accuracy of your work.

A. Machine and all components lubricated, cleaned, and free of dust and dirt.

B. All lubrication points properly lubricated and wiped free of excess lubricants.

C. Inspection procedures followed and entries properly made on DA Form 2404.

D. Safety and workmanship precautions followed.

V. Operator Preventive Maintenance Services and Maintenance Forms.

A. Principles of Lubrication.

1. Before a sewing machine is lubricated, it is necessary to know the principles of lubrication.

2. The first method is known as the direct application. With this method the oil is applied through a hole in the part to feed the bearing surface. This method, because it is not long lasting, requires the machine to be oiled twice a day or every four (4) hours of operation.

3. The gravity feed method is where the oil is applied in a well. The oil flows from the well through a tube that is attached to the well at one end, and to the part that requires lubrication at the other end of the tube. As the part revolves, it uses the oil that flows through the tube. This should be checked twice daily or every 4 hours of operation.

4. The waste pack type of lubrication uses a reservoir packed with felt or cotton material that looks like waste (broken threads, shreaded material, etc.). It is widely used on electrical motors. This "waste" is set directly under the armature shaft bushing to be lubricated. The armature shaft turning in the bushing will draw the oil up and into the bushing by means of friction. This method is used when a constant supply of lubricant is required, and to prevent oil from getting into the field winding or on the armature.

B. Types of Lubricants Required.

1. The lubricating oil (LO) used to lubricate the clothing and textile sewing machines is a highly refined mineral oil with a low pour point. It may be used in all temperatures, both above and below zero. This oil is free of paraffin which would cause the machine to "gum up" and collect grit and dust, which in turn would cause the parts to wear unnecessarily. "LO" means oil, light lubrication.

2. The lubricating oil (LO) is also used to lubricate the sewing machine motors, if the motor has an oil hole and not a grease fitting.

C. Lubrication Charts. (Fig 62)

Refer to TM 10-3530-203-10 Operator's Manual, pg 90. Closely observe the lubricating charts, and locate the following important factors.

1. As you can see, the lubrication charts give you a wealth of information. All this information is important, if you are to

maintain the equipment effectively. The lubrication charts must be followed at all times.

2. Each machine has its particular or specified lubrication chart.

3. The lubrication charts "point out" by pictures, the various locations of applying the lubricating oil and/or grease.

4. The charts tell what types of lubricant to apply to the various locations.

5. The charts will have the intervals of lubrication and application points.

6. Lubrication instruction.

NOTE: Before lubricating machine, make sure motor switch is OFF.

a. The lubrication instruction in the particular technical manual pertaining to a specific sewing machine must be used in conjunction with the lubrication charts. These instructions not only tells what to lubricate, and how much lubricant to apply, but they also tell how to lubricate, where to lubricate, what lubricant to use, how to clean specific parts, and what to clean the parts with. (Follow Lubrication Chart Fig 62)

b. Never deviate from these instructions, except as indicated in the instruction for usual and unusual operations.

c. Before applying any lubricant, remove all dirt, dust, grit, and lint that may be on the equipment being lubricated, also clean after application.

d. Never "over flood" the machine with oil, as this is just as bad as not lubricating at all. The "overflooding" will accumulate dust and grit, which will cause undue wear on parts.

D. Lubrication of Sewing Machine Heads. (Fig 63)

1. Basically, all sewing machine heads are lubricated in the same manner, but as we stated previously you must follow the instructions or each lubrication chart for each specific machine. There may be a difference in intervals of lubrication.

2. The important factor to remember, is to apply the oil to the points as indicated by an arrow in the lubricating chart. In addition, the oiling points on the sewing machine heads are normally marked with red at the openings.

3. Most oil points on the machine will require from one to three drops of oil twice daily (every 4 hours of operation).

E. Lubrication of Shuttle Assembly.

1. The shuttle assemblies of the light duty, medium duty, heavy duty, and darning machines will require lubrication every time a full bobbin is inserted into the machine. Lubricate with two or three drops of oil.

2. At the end of each day of operation, the shuttle assembly of the light and heavy duty sewing machine should be removed, disassembled, cleaned, lubricated, reassembled, and placed in the machine.

F. Lubrication of the Bed Assembly. (Fig 63)

1. The bed assembly is lubricated in the same manner as the head assembly, with one to three drops of oil at the oiling points twice daily (every four hours of operation).

2. There is one area to lubricate when lubricating the bed assembly. Lubricate through the oil points of the bed of the machine. Do not tilt the machine back to lubricate under the bed.

G. Lubrication of the Bobbin Winder Assembly.

1. The bobbin winder hinge pin and frame oil well are lubricated twice a day (every four hours of operation) with one to three drops of oil.

2. When lubricating the bobbin winder, rotate the wheel two or three turns to distribute the oil completely around the spindle.

H. Lubrication of the Motor.

1. It is important that you refer to the lubrication chart before lubricating a motor, as motors have a greater span of intervals between lubrication.

2. Every three months lubricate the grease fittings with 3 to 5 strokes of a grease gun containing ball and roller bearing grease (BR).

3. Each month fill the waste-packed oil reservoir at the terminal end of the motor shaft with (LO) lubricating oil.

NOTE: Never over-lubricate the motor, as this will cause shorting out the electrical fields inside the motor.

I. Machine Differences.

1. The heavy duty and light duty sewing machines are lubricated in the same manner, with one exception. The heavy duty machine has an oil pot for lubricating the needle thread. This is required because the machine is used primarily to sew heavy materials which

763 also requires the use of heavy thread. The combination of heavy materials and thread will create a large amount of friction during operation, the oil on the thread acts as a coolant and prevents the needle from heating and bending, and the thread from excessive breakage.

2. The darning machine and the medium duty sewing machine are also lubricated in the same manner. Each of the machines contains the same type of sewing hook and shuttle assembly, which has a small green felt pad under the bobbin that must be oiled as required, but the medium duty has a thread lubricator reservoir and a series of tubes running from the reservoir for the bed and head.

3. The four models of machines discussed thus far are basically lubricated in the same manner with the exceptions mentioned.

4. The overedger machine has an automatic or self-lubricating system employing the splash and wick system. When we say automatic or self-lubricating, this does not mean that we do nothing about lubricating the machine. The sight gauge on the front of the machine must be observed and when it indicates a low oil level, it must be refilled with oil until the oil level is aligned with the red indicator line on the sight gauge. DO NOT "OVER FILL".

J. Lubrication of Sewing Machines Under Unusual Conditions.

1. Heat and Cold Areas - Extremes of heat and cold have little or no effect upon the operation of the sewing machines. Extremes of humidity, however, may require the sewing machines to be lubricated more frequently because even ordinary humidity will cause the machines to

rust or corrode unless they are kept thoroughly oiled.

2. Sandy and Dusty Areas - In extremely sandy and dusty areas, the working parts of the sewing machine will require more frequent cleaning and lubrication.

K. Detailed Lubrication Information.

1. Keep all lubricants in closed containers and store them in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

2. Points of Lubrication - The numbers inserted on the borders of each lubrication order are listed consecutively, and refer to specific lubrication points.

3. Cleaning - Keep all external parts that do not require lubrication free of lubricants. Before lubricating the equipment, wipe dirt and grease from all lubrication points. After lubricating, wipe off excess lubricants. Do not let the excess drip all over the machine.

4. Operation Immediately after Lubrication - Operate the machines immediately after lubrication to distribute the oil on all moving parts.

L. Use of Preventive Maintenance DA Form 2404 in Performing Operator's Maintenance (Equipment Maintenance and Inspection Worksheet).

1. A standardized form, that you will record inspection, checkouts, and maintenance services.

2. Requires all inspectors at all levels of maintenance to use the appropriate maintenance publication for the equipment and level of maintenance being inspected to take the guess work out of our maintenance system.

3. Preparation of DA Form 2404.

a. The instructor will demonstrate the current method of filling out DA Form 2404.

b. Student will follow instructor step-by-step in filling out DA Form 2404.

c. Assistant instructor will walk through class aiding students that need help.

d. Block 1 - Enter the unit or organization designation (CMI personnel enter the organization to which the equipment is assigned).

e. Block 2 - Enter the nomenclature and model designation of the equipment as it is recorded in the log book or equipment TM.

f. Block 3 - Enter the requirement registration number, serial number, or Federal stock number as applicable.

g. Block 4 - This does not pertain to textile repair.

h. Block 6 - Enter the type of inspection or service to be performed (operator's daily, "O" services, initial "TI", CMMI, etc).

i. Block 7 - Enter the current technical manual number with the latest changes, and TM date applicable to the equipment. Two blocks are provided when more than one TM is used.

4. Perform each check listed in the TM applicable to the

inspection performed, following the sequence listed in pertinent TM, complete DA Form 2404 as follows:

a. Column a - Enter TM item number.

b. Column b - For army aircraft, enter condition status; for other equipment enter "DL" if condition deadlines equipment.

c. Column c - Enter deficiencies and shortcomings.

d. Column d - Show corrective action for deficiency or shortcoming listed in column c.

e. Column e - Individual ascertaining completed corrective action will initial in this column.

f. For command materiel readiness inspection, enter scoring codes as follows: "D" for deficiency, "S" for shortcoming, "R" for materiel readiness rating, "O" for organizational maintenance rating, "F" for field maintenance rating.

5. Technical manuals pertaining to textile equipment.

a. The TM 10-3530-203-10 contains information on the service upon receipt of the machine, operator's controls and adjustments, operation under usual condition, operation under unusual conditions, and guidance of the personnel of the using organization.

b. TM 38-750 will be used in conjunction with TM 10-3530-203-10.

LUBRICATION ORDER **LO 10-3530-202-10-3**

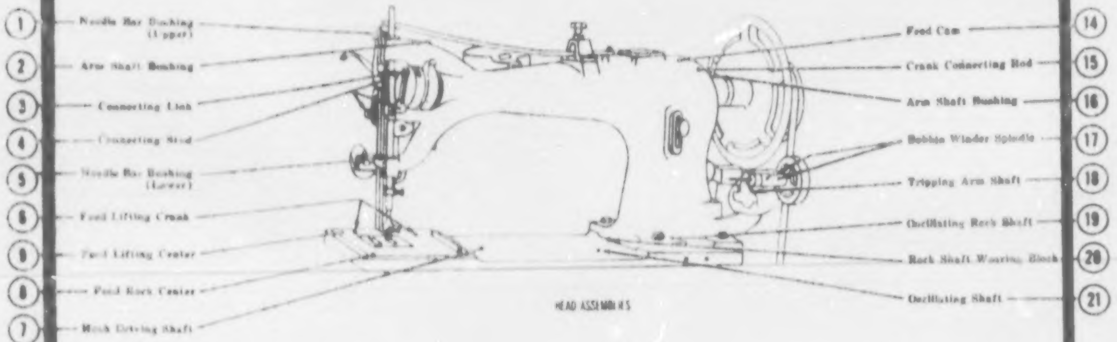
Reference C9100-IL

MACHINE, SEWING, HEAVY DUTY

Reduce intervals under severe operating conditions.
Lubricant for all points — LO

Clean parts before lubricating sewing machine.
Wash parts with SOLVENT, drycleaning
Intervals for all points — Every 4 hours.

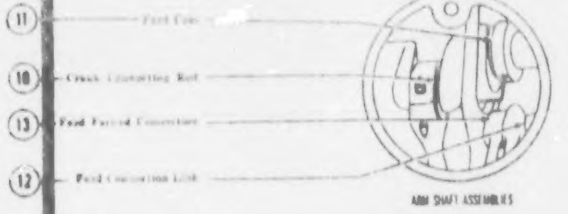
FIG. 49


① Needle Bar Bushing (Upper)
② Arm Shaft Bushing
③ Connecting Link
④ Connecting Stud
⑤ Needle Bar Bushing (Lower)
⑥ Feed Lifting Crank
⑨ Feed Lifting Center
⑧ Feed Rock Center
⑦ Hook Driving Shaft
⑭ Feed Cam
⑮ Crank Connecting Rod
⑯ Arm Shaft Bushing
⑰ Bobbin Winder Spindle
⑱ Tripping Arm Shaft
⑲ Oscillating Rock Shaft
⑳ Rock Shaft Wearing Block
㉑ Oscillating Shaft

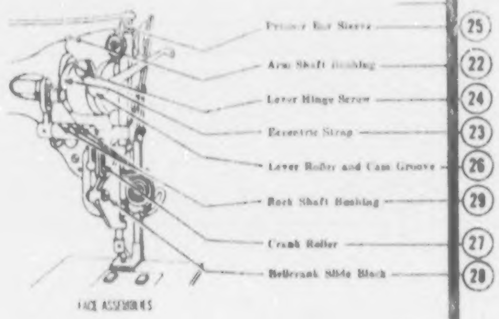
HEAD ASSEMBLIES

FOLD

FOLD


⑪ Feed Cam
⑩ Crank Connecting Rod
⑬ Feed Forked Connection
⑫ Feed Connection Link

ARM SHAFT ASSEMBLIES


㉕ Presser Bar Sleeve
㉒ Arm Shaft Bushing
㉔ Lever Hinge Screw
㉓ Eccentric Strap
㉖ Lever Roller and Cam Groove
㉙ Rock Shaft Bushing
㉗ Crank Roller
㉘ Bellcrank Slide Block

FACE ASSEMBLIES

— KEY —

LUBRICANTS	EXPECTED TEMPERATURES			INTERVALS
	above +32 F	+40 F to −10 F	0 F to −65 F	
LO–OIL, lubricating general purpose	LO Below 32 F it is recommended that sewing machine be operated in a heated tent or building			4—Every 4 hours

NOTES

Twice daily lubricate those moving parts indicated above by arrows with 1 to 3 drops of general purpose lubricating oil (LO).

A copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory.

Figure 62 Lubrication Order 10-3530-202-10-7 for heavy duty sewing machine

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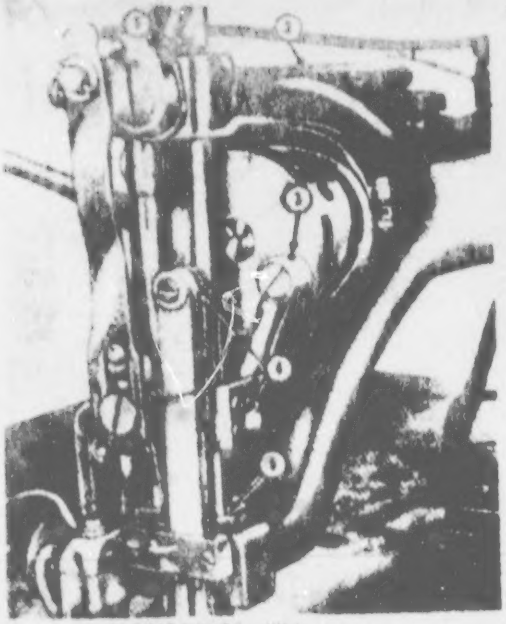
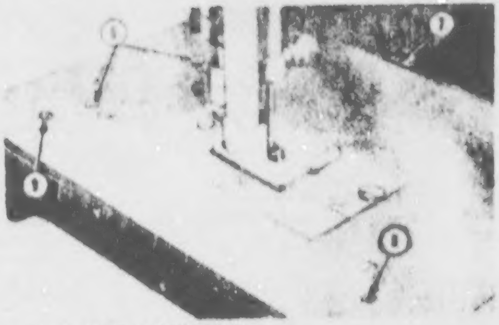
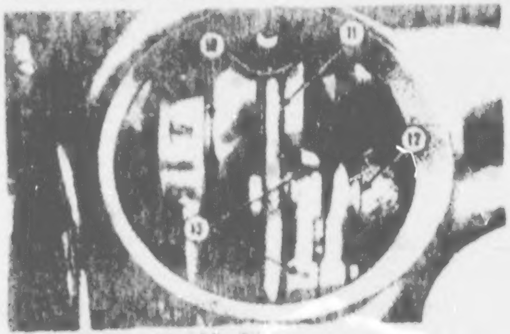


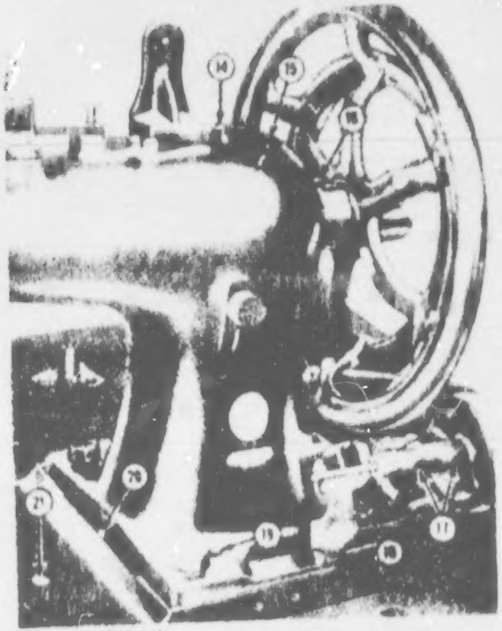
REF 1 NEEDLE BAR BUSHING (UPPER)
REF 2 ARM SHAFT BUSHING
REF 3 CONNECTING LINK
REF 4 CONNECTING STUD
REF 5 NEEDLE BAR BUSHING (LOWER)



REF 6 FEED LIFTING CRANK
REF 7 HOOK DRIVING SHAFT
REF 8 FEED ROCK CENTER
REF 9 FEED LIFTING CENTER



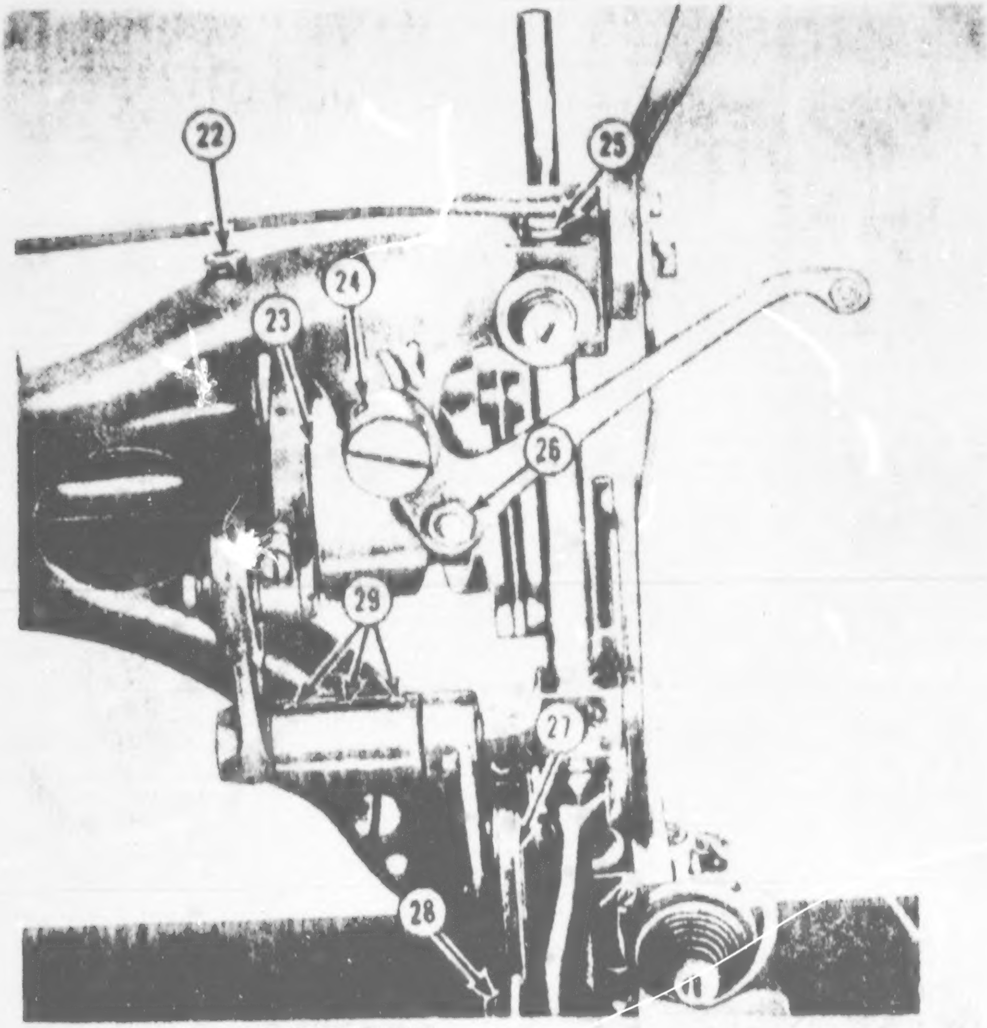
REF 10 CRANK CONNECTING ROD
REF 11 FEED CAM
REF 12 FEED CONNECTION LINK
REF 13 FEED FORKED CONNECTION



REF 14 FEED CAM
REF 15 CRANK CONNECTING ROD
REF 16 ARM SHAFT BUSHING
REF 17 BOBBIN WINDER SPINDLE
REF 18 TRIPPING ARM SHAFT
REF 19 OSCILLATING ROCK SHAFT
REF 20 ROCK SHAFT BEARING BLOCK
REF 21 OSCILLATING SHAFT

D

Figure 63 Lubrication points on heavy-duty sewing machines.



REF. 22	ARM SHAFT BUSHING
REF. 23	ECCENTRIC STRAP
REF. 24	LEVER HINGE SCREW
REF. 25	PRESSER BAR SLEEVE
REF. 26	LEVER ROLLER AND CAM GROOVE
REF. 27	CRANK ROLLER
REF. 28	BELLCRANK SLIDE BLOCK
REF. 29	ROCK SHAFT BUSHING

Figure 63.- Continued.

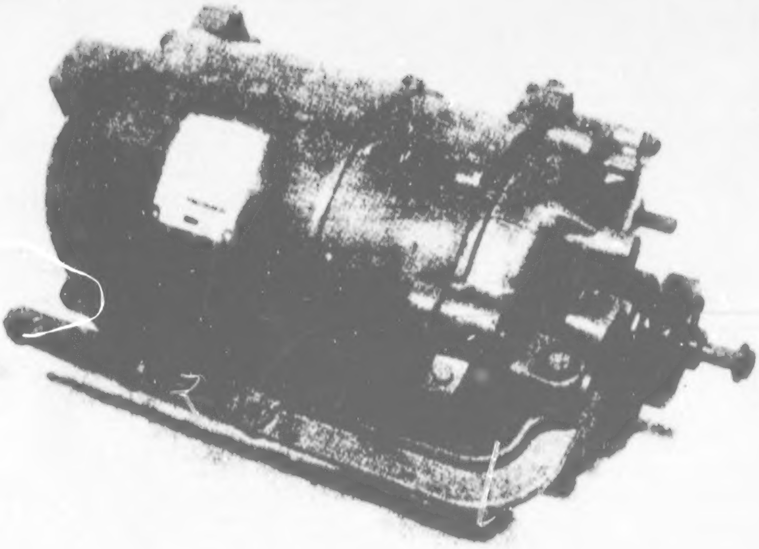


Figure 63. - Continued

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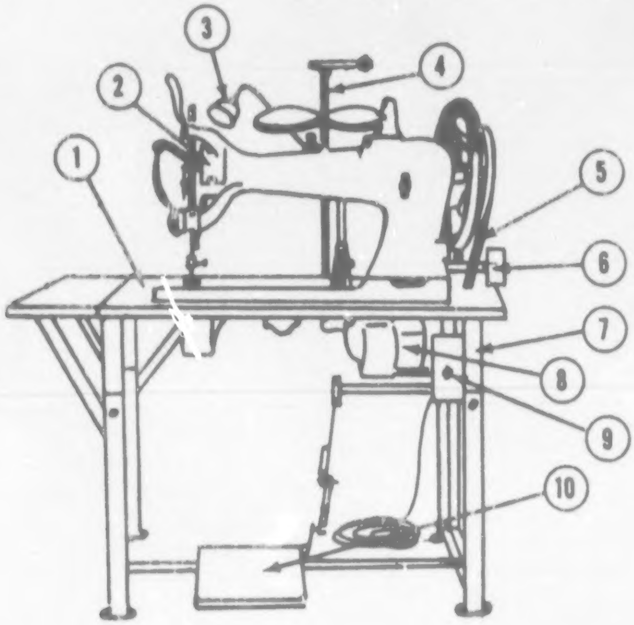
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 10-3530-203-10 MACHINE, SEWING, HEAVY DUTY



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level.	
2	MACHINE HEAD. Inspect the machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed.	

Figure 64 Daily preventive maintenance services for heavy-duty sewing machine.

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ITEM		PAR REF
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for 1/4-inch finger-pressure deflection midway between pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components and loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
8	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections, and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	
9	MOTOR SWITCH. Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switchbox. Check the switch for improper operation; make certain it turns the motor on and off.	

Figure 64. Continued.

ITEM		PAR REF
10	STARTING TREADLE. Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine. NOTE 1. OPERATION. During operation observe for any unusual noise or vibration. NOTE 2. Damage to any Item (1 through 10) will be reported as stipulated in TM 38-750.	

Figure 64 – **Continued.**

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SECTION XIX

OPERATOR'S MAINTENANCE OF MEDIUM DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope.

With this instruction on detailed lubrication instructions of the medium duty model sewing machine, you will be able to lubricate the medium duty model sewing machine with prescribed lubricants according to the service intervals and points of application specified on lubrication chart, and perform "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards. The medium duty sewing machine operates at a higher rate of speed and therefore has more oiling points than the other machines you have worked with, and as you know, the faster a machine runs, the better lubricating system it must have.

II. General Description.

The medium duty sewing machine has a hook and saddle assembly. This is far different than the shuttle race assembly of the light and heavy duty sewing machine. The hook in the medium duty machine rotates in one direction, at a top speed of 3500 RPM. This is much faster than the shuttle oscillates in the light duty machine, and for this reason, lubrication is of prime importance to this assembly and machine.

III. Reference.

TM 10-3530-203-10.

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IV. **Performance Checking Standards.** Use these standards to check your performance.

A. Machine and all components lubricated, cleaned, and free of dust and dirt.

B. All lubrication points properly lubricated and wiped free of excess lubricants.

C. Inspection procedures followed and entries properly made on DA Form 2404.

D. Safety and workmanship precautions followed.

V. Operator Maintenance of Medium Duty Sewing Machine.

A. Daily Preventive Maintenance Services. To insure that the canvas repair equipment is ready for operation at all times, its components must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation shall be noted and correction made as soon as the operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equipment if operation were continued. All deficiencies and shortcomings, together with the corrective action taken, will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity. The "before, during and after" preventive maintenance services to be performed on the medium duty sewing machine are listed as follows:

NOTE: Use DA Form 2404 to check out machine.

1. Before operation the operator should:

a. Inspect for evidence of tampering.

b. Inspect drive belt for cracks and wear.

c. Test drive belt for adjustment (too loose or too tight).

d. Inspect for proper threading and tension by inspecting test patch left under needle on preceding evening.

e. Inspect motor switch for stopping and starting.

f. Inspect electrical connections for breaks or frayed wires.

g. Inspect for damaged, broken, loose or missing parts and components.

h. Check motor clutch treadle for proper starting and stopping of machine.

i. See that machine has been cleaned and lubricated according to the lubrication chart.

j. Report any malfunction you cannot take care of, as an operator, to the organizational mechanic or supervisor.

k. Make all authorized replacements, and perform preventive maintenance services.

2. During Operation.

a. Lubricate every 4 hours of operation according to the lubrication chart.

b. Make sure thread lubricator has proper level of oil and lubricator is turned on (the release lever should be straight out).

c. Clean shuttle race and feed dog of any accumulation of dirt, grit and waterproof compounds that may bind the machine or keep the machine from functioning properly, or feeding properly.

d. Make all authorized adjustments and replacements that may be needed.

e. Listen for any unusual noises, knocks, scrapes, rubbing, etc.

f. Be alert for any screw or part that may work loose.

g. Report any malfunction that you, as an operator, cannot adjust or replace to the supervisor.

h. Lubricate the shuttle race assembly each time a bobbin is replaced in the bobbin case.

i. Replace broken needles, and keep the throat plate and presser feet tight.

3. After Operation Service (before leaving the machine after a day's run).

a. Clean dirt, lint and grit out of all moving parts, and the feed dogs.

b. Lubricate the machine and check if thread reservoirs has lubricating oil.

c. Leave a test patch under the presser feet to indicate the machine is stitching properly (run a line of stitches on the test patch and do not break the thread stitch from the patch).

d. Turn off motor.

e. Turn off thread lubricator (release lever should be even with face plate).

f. Cover machine head.

4. Lubrication Instruction.

a. The lubrication instruction in the particular technical manual pertaining to a specific sewing machine must be used in conjunction with the lubrication chart. These instructions not only tell what to lubricate and how much lubricant to apply, but they also tell how to lubricate, where to lubricate, what lubricant to use, how to clean specific parts, and what type of cleaning solvents are used.

b. Never deviate from these instructions, except as indicated in the instruction for usual and unusual operations.

c. Before applying any lubricant, remove all dirt, dust, grit, and lint that may be on the equipment being lubricated, also clean after application.

d. Never "flood" the machine with oil as this is just as bad as not lubricating at all. The "flooding" will accumulate dust and grit, which will cause undue wear on parts.

B. Safety Precautions.

1. While making adjustments, the operator must be careful to cut off the motor switch, or to remove the driving belt before he removes needles, bobbins, or performs other adjustments, which bring his fingers under the needle. Otherwise, he may accidentally start the machine by stepping on the foot treadle pedal, and injure his hands or fingers.

2. While operating the machine, the operator must at all times be careful to keep his fingers away from the needle.

3. While making electrical connections, the alternating current generated by the trailer equipment for operation of the machine is of sufficient amperage to be dangerous. Using personnel should be careful, especially while making connections between machine motors and the generator. The operator should take every precaution to prevent current from passing through his body to the ground, especially wet ground. The extension cords are well insulated, but the operator must keep his hands off bare terminals or wires which are connected to the generator.

C. Use of Preventive Maintenance DA Form 2404 in Performing Operator's Maintenance on Medium Duty Sewing Machine (Equipment Maintenance and Inspection Worksheet).

1. A standardized form that you will record inspection, checkouts and maintenance services (form was used with heavy duty machine).

2. Requires all inspectors at all levels of maintenance to use the appropriate maintenance publication for the equipment and level of maintenance being inspected to take the guess work out of our maintenance system.

3. Remember to use the form when you perform your "before" operator's preventive maintenance services.

4. Technical manuals pertaining to textile equipment.

a. The TM 10-3530-203-10 contains information on the service upon receipt of the machine, operator's controls and adjustments, operation under usual condition, operation under unusual condition, and guidance of the personnel of the using organization.

b. TM 38-750 will be used in conjunction with TM 10-3530-203-10.

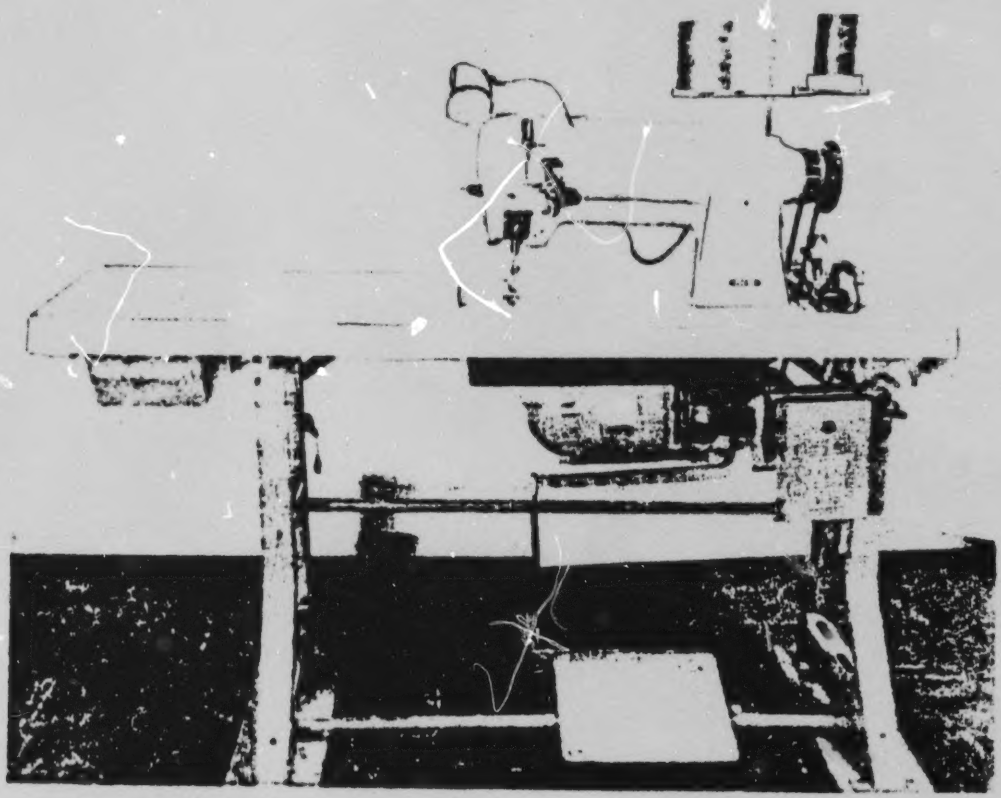

Figure 85. MEDIUM DUTY SEWING MACHINE

NOTE: PAGE 166 HAS BEEN OMITTED; HOWEVER ALL MATERIAL IS INCLUDED.

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LUBRICATION

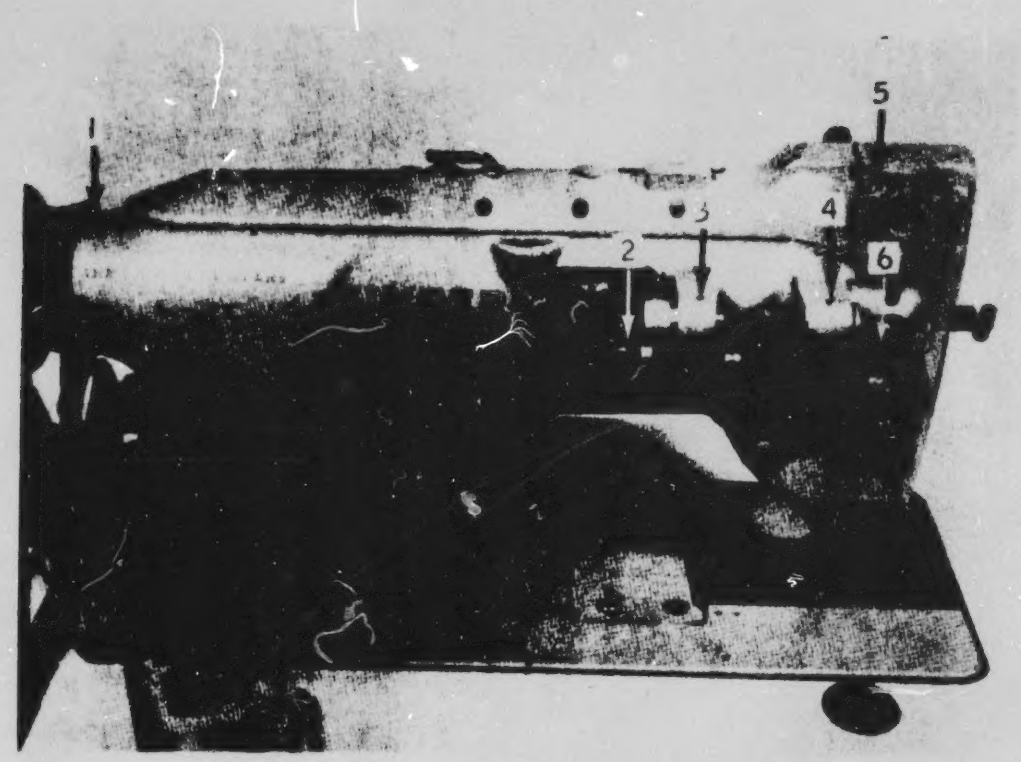

Figure 86. Lubrication points in back of machine

LUBRICATION
(Cont.)

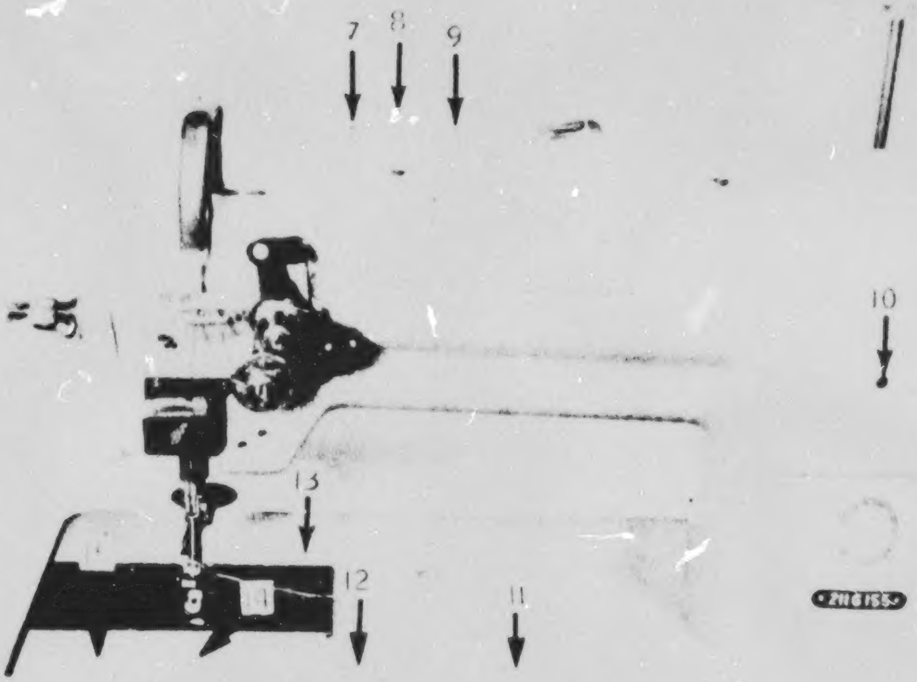
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Figure 86 A. Lubrication points on top and front of machine.

LUBRICATION
(Cont.)

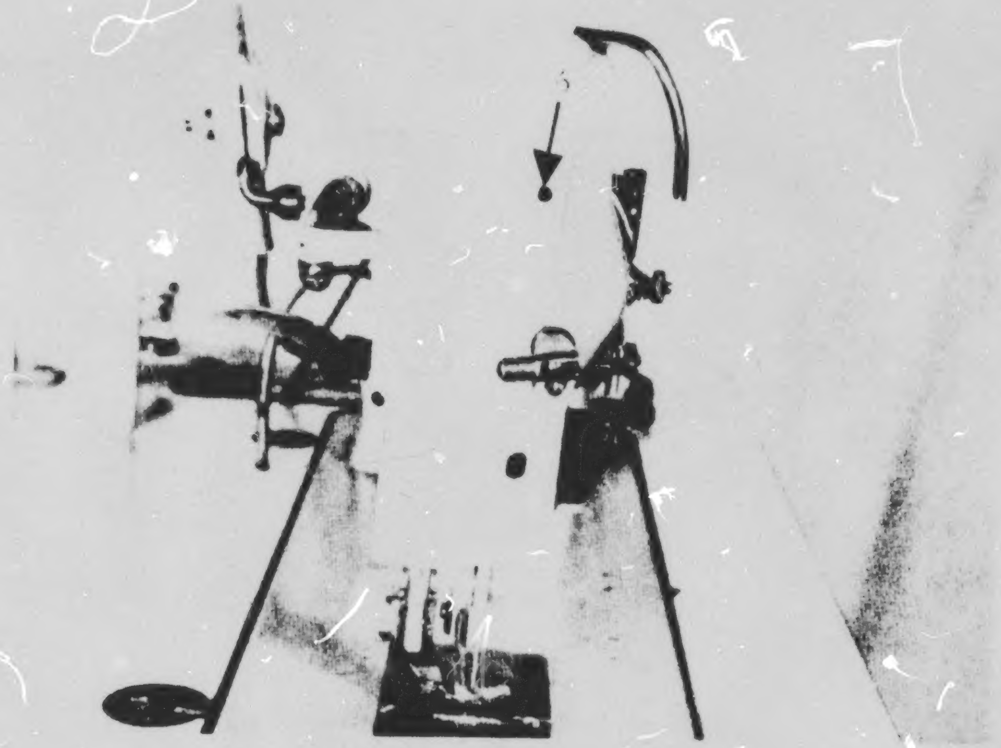

Figure 86 B. Lubrication point face plate of machine.

LUBRICATION (Cont.)

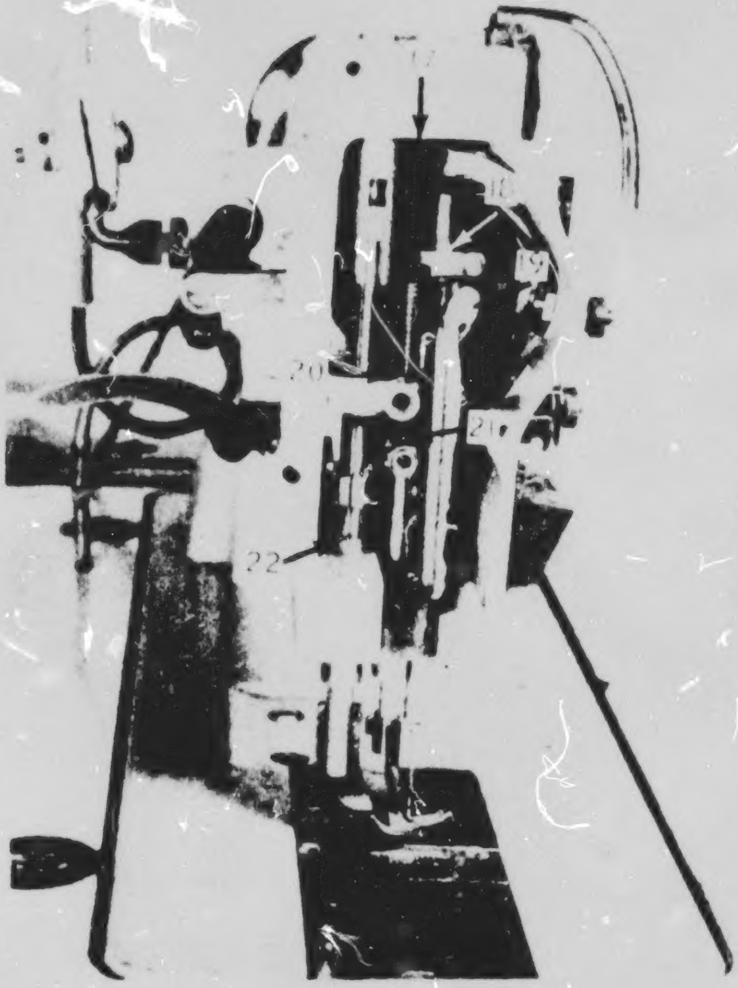
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Figure 86 C. Lubrication points. (face assembly) of machine.

LUBRICATION
(Cont.)

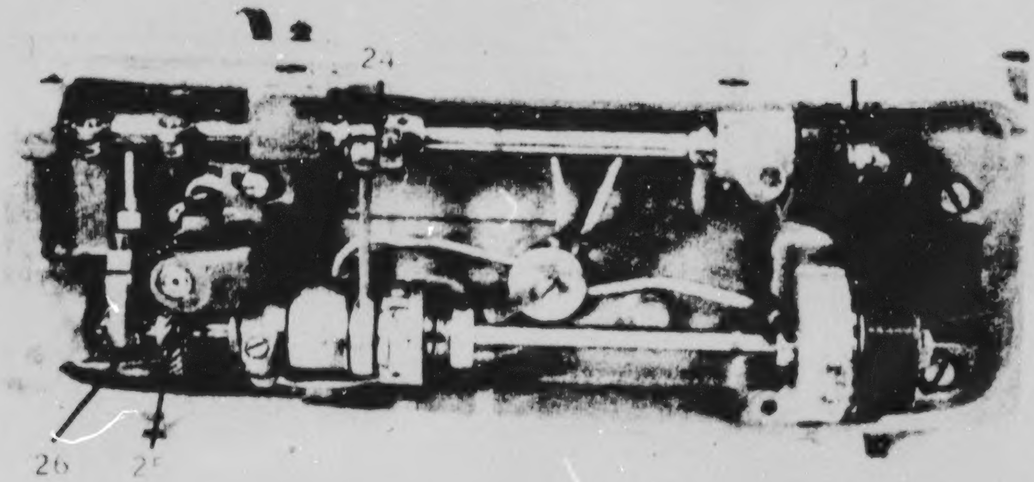


Figure 86 D. Lubrication points. (Under machine bed.)

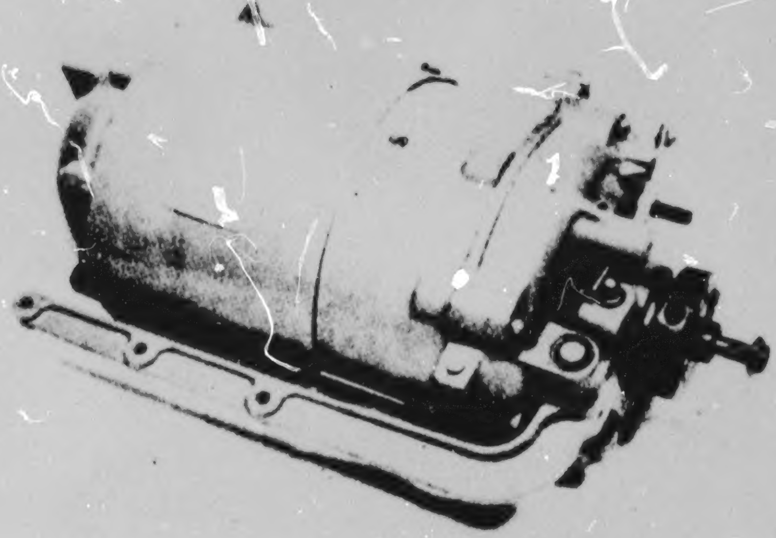
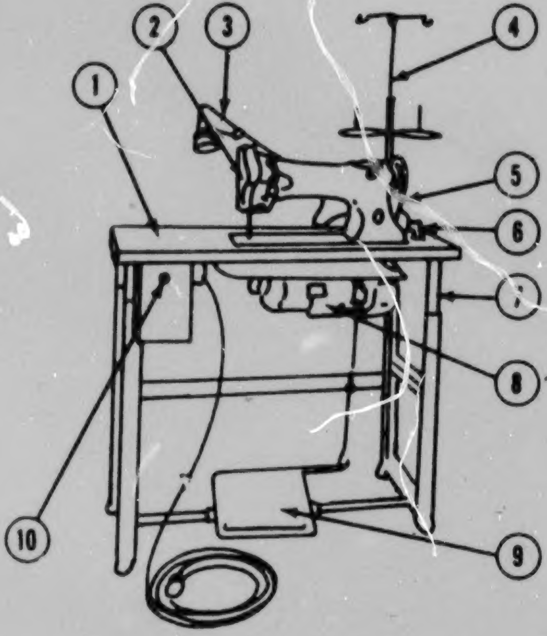


Figure 87. Motor and Clutch assembly.

PREVENTIVE MAINTENANCE SERVICES
DAILY

MACHINE, SEWING, TEXTILE



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level.	

Figure 88. *Daily preventive maintenance services for textile sewing machine.*

ITEM		PAR REF
2	MACHINE HEAD. Inspect the machine head for dirty surfaces and grease deposits: for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed.	
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for 1/4-inch finger-pressure deflection midway between pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components; and loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
8	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits, for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	

Figure 88 (Continued)

ITEM		PAR REF.
9	**STARTING TREADLE.** Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine.	
10	**MOTOR SWITCH.** Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switchbox. Check the switch for improper operation; make certain it turns the motor on and off. **NOTE 1. OPERATION.** During operation observe for any unusual noise or vibration.	

Figure 88 (Continued)

SECTION XXIII

OPERATOR MAINTENANCE OF THE LIGHT DUTY SEWING MACHINE:

MAINTENANCE FORMS

PRACTICAL EXERCISE

I. Purpose and Scope.

The instruction in this section on operator maintenance and detailed lubrication instructions for the light duty model sewing machine will enable you to lubricate the sewing machine with prescribed lubricant in accordance with appropriate service intervals and points of application specified on the lubrication chart contained in TM 10-3530-203-10; using the operator's check list, safety standards, and equipment inspection and maintenance worksheet (DA Form 2404), you will be able to perform the "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards, and make appropriate entries on DA Form 2404. It is obvious that equipment not lubricated as required, or lubricated with improper lubricants, can cause serious damage to a piece of equipment. It can be a sewing machine or it may be an automobile. In either case, proper lubrication is important, especially to you as a canvas and webbed repairman, to prevent malfunctions of your sewing machines and/or equipment.

II. Reference.

TM 10-3530-203-10.

III. Performance Standards. Use these standards to check the accuracy of your work.

A. Machine and all components to be lubricated are cleaned and free of dirt and dust before lubricating.

B. All lubrication points properly lubricated and wiped free of excess lubricants.

C. Parts are not "flooded" with lubricants.

D. Safety precautions followed.

E. Entries made on DA Form 2404.

IV. Operator Maintenance of Light Duty Sewing Machine. (Refer to Figure 95 thru 97)

A. Preventive Maintenance Services.

1. Before operation, the operator should:

a. Inspect for evidence of tampering.

b. Inspect drive belt for cracks and wear.

c. Test drive belt for adjustment (too loose or too tight).

d. Inspect for proper threading and tension by inspecting test patch left under needle on preceding day.

e. Inspect motor switch for stopping and starting.

f. Inspect electrical connections for breaks or frayed wires.

g. Inspect for damaged, broken, loose, or missing parts and components.

h. Check motor clutch treadle for proper starting and stopping of machine.

i. See that machine has been cleaned and lubricated according to the lubrication chart.

j. Report any malfunction you cannot take care of, as an operator, to the organizational mechanic or supervisor.

k. Make all authorized replacements and adjustments, and perform preventive maintenance services.

2. During operation.

a. Lubricate every 4 hours of operation according to the lubrication chart.

b. Clean shuttle race and feed dog of any accumulation of dirt, grit, and waterproof compounds.

c. Make all authorized adjustments and replacements that may be needed.

d. Listen for any unusual noises, or excessive vibration.

e. Be alert for any screws or parts that may work loose.

f. Report any malfunctions that you as an operator cannot adjust or replace to the immediate supervisor.

g. Lubricate the shuttle race assembly each time a bobbin is replaced in bobbin case.

h. Replace broken needles, and keep the throat plate and presser foot tight.

3. After operation services - before leaving the machine after a day's run, the operator should:

a. Clean dirt, lint and grit out of all moving parts.

b. Lubricate the machine.

c. Leave a test patch under the presser foot (to indicate the machine will operate).

d. Turn off motor.

e. Cover machine head.

4. Lubrication points.

a. The lubrication instruction in the particular technical manual pertaining to a specific sewing machine must be used in conjunction with the lubrication charts. These instructions not only tell what to lubricate and how much lubricant to apply, but they also tell how to lubricate, where to lubricate, what lubricant to use, when (intervals) to use, how to clean specific parts, and what type of cleaning solvents are used.

b. Never deviate from these instructions, except as indicated in the instruction for usual and unusual operations.

c. Before applying any lubricant, remove all dirt, dust, grit, and lint that may be on the equipment being lubricated, also clean after application.

d. Never "flood" the machine with oil as this is just as bad as not lubricating at all. The "flooding" will accumulate dust and grit which will cause undue wear on parts.

B. Safety Precautions.

1. While making adjustments, the operator must be careful to cut off the motor switch, or to remove the driving belt before he removes needle, bobbin, or performs other adjustments which bring his fingers under the needle. Otherwise, he may accidentally start the

machine by stepping on the foot treadle pedal, and injure his hands or fingers.

2. While operating the machine, the operator must at all times be careful to keep his fingers away from the needle.

3. While making electrical connections, the alternating current generated by the trailer equipment for operation of the machine is of sufficient amperage to be dangerous. Using personnel should be careful, especially while making connections between machine motors and the generator. The operator should take every precaution to prevent current from passing through his body to the ground, especially wet ground. The extension cords are well insulated, but the operator must keep his hands off bare terminals or wires which are connected to the generator.

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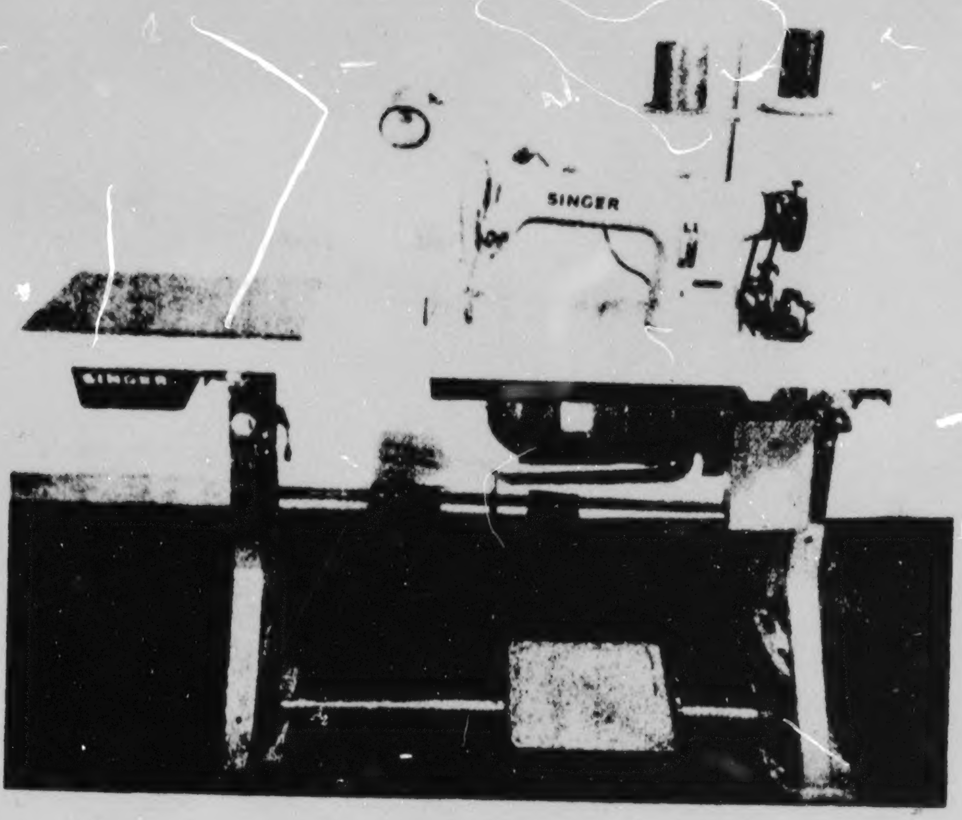
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SINGER

Figure 95. LIGHT DUTY SEWING MACHINE

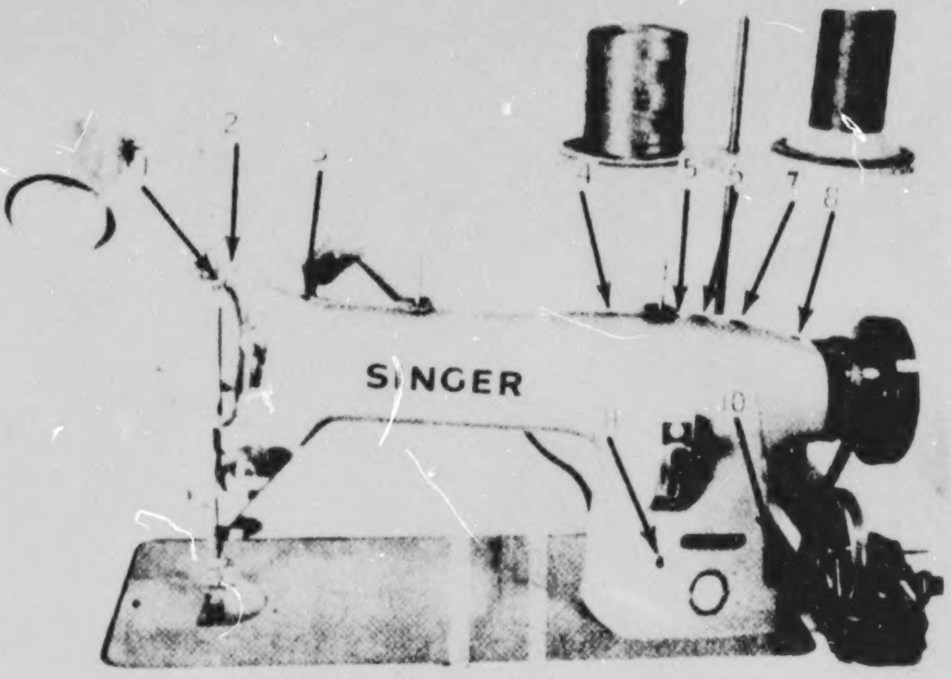
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Figure 96. Oiling points. (Top and front view.)

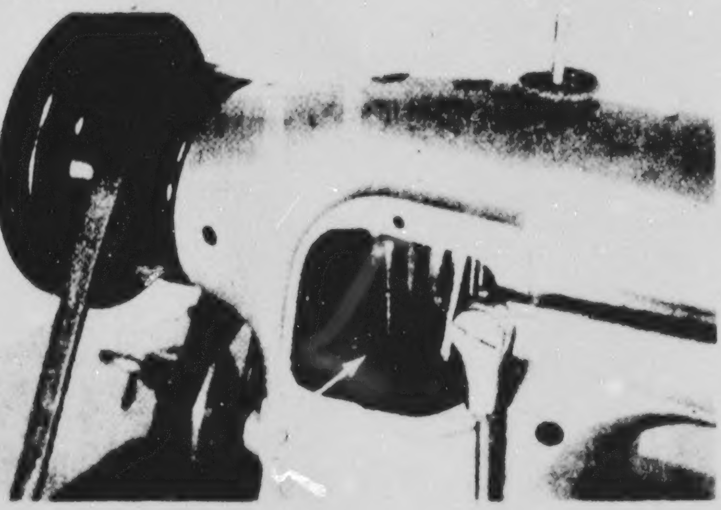

Figure 96 A. Oiling points. (Rear view.) Open cover to apply oil.

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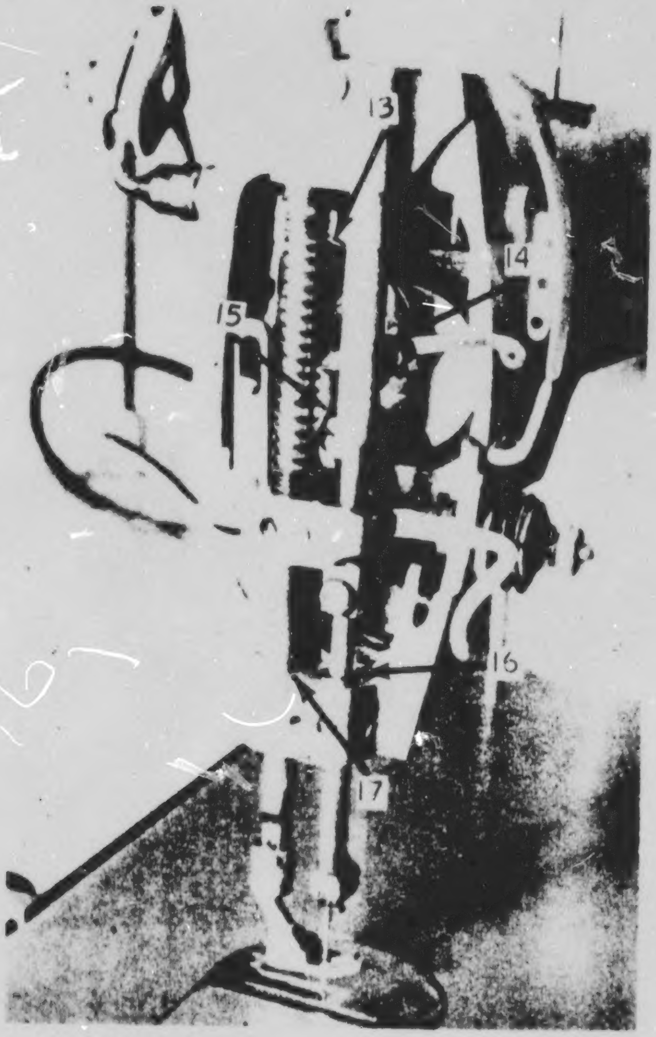
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Figure 96 B. Oiling points. (Face assembly.)

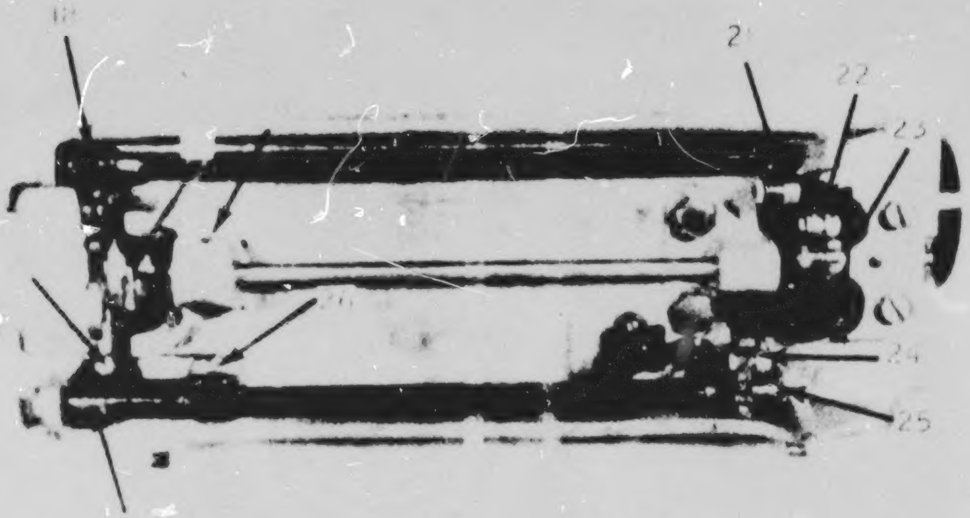
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Figure 96 C. Oiling points. (Under machine bed.)

Figure 96 D. Motor and clutch assembly.

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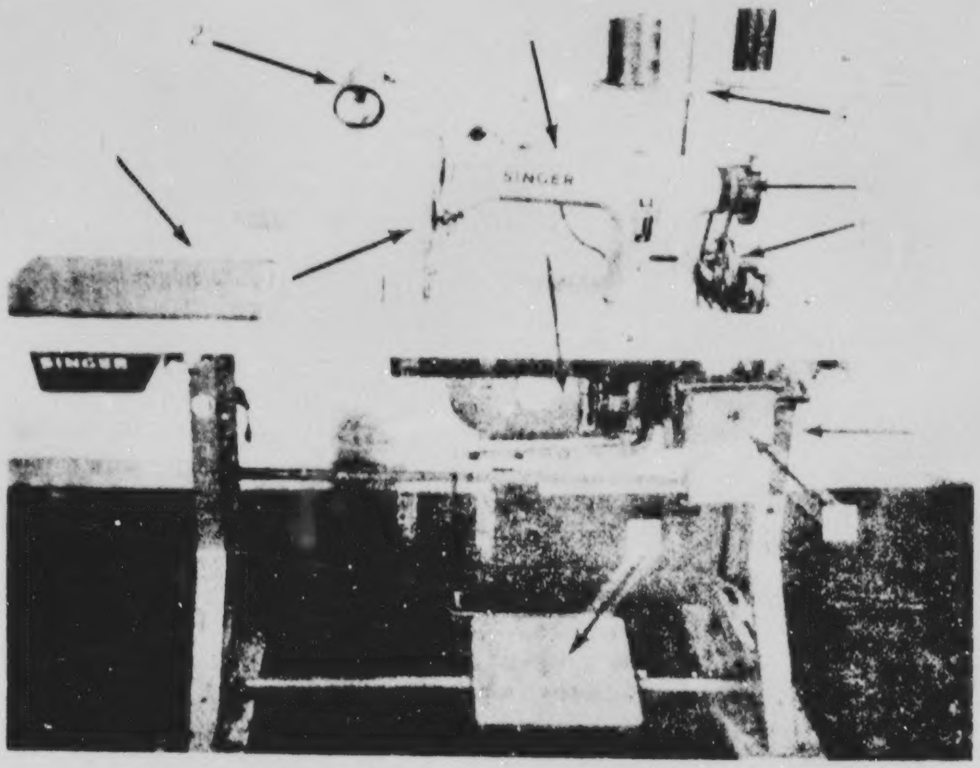
Figure 97.

PREVENTIVE MAINTENANCE SERVICES DAILY

TM 10-3530-203-10 MACHINE, SEWING, CLOTHING



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.	

ITEM		PAR REF
2	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
3	CLOTHING MACHINE HEAD. Inspect the clothing machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting. Make certain the needle is installed with the long groove to the operator's left.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for a 1-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components, and loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	

Figure 97 (Continued)

ITEM		PAR REF
8	**FOLDING STAND**. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
9	**STARTING TREADLE.** Inspect the treadle for bent, broken, or loose components, and loose mounting. Operate the treadle to see that the pulley brake lever engages the motor drive pulley with the drive motor when the treadle is depressed. Make certain the pulley brake lever disengages the drive pulley from the motor and stops the pulley when the treadle is released (during operation).	
10	**MOTOR SWITCH**. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off.	
11	**PRESSER BAR LIFTER**. Inspect for bent or broken presser bar lifter. Inspect the lifter for loose mounting. Make certain the lifter raises, locks, unlocks, and lowers the presser foot.	
	NOTE 1. OPERATION. During operation observe for any unusual noise or excessive vibration.	

Figure 97 (Continued)

SECTION XXVIII

OPERATOR'S MAINTENANCE OF SPECIAL PURPOSE DARNING AND OVEREDGING MACHINES

PRACTICAL EXERCISE

I. Purpose and Scope.

This section provides instruction on operator's maintenance and detailed lubrication instructions on the model darning and overedging machine. With this instruction, you will be able to lubricate the machine with prescribed lubricant according to the service intervals and points of application specified on the lubrication chart, and be able to perform "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards. In previous hours of instruction, you were taught operator's preventive maintenance services to include lubrication and safety precautions. It will be equally important to perform the same services to the darning and overedging machines. You will find that these machines are operated a little different than the previous machines. In addition to being operated in a different manner, you will also find that the overedging machine serves a different purpose and makes an unusual type of stitch in comparison to the darning machine. Regardless of the operation, use, or type of machine, it will be necessary to perform the operator's preventive maintenance services. This is necessary to prolong the life of the machine. Preventive maintenance is used by almost everyone in our daily life. For example, we keep a close check on the oil pressure of our

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personal cars, check the tires for air pressure, lubricate the chasis as required. We do all this for one reason. We know the price we paid for it, and therefore, we're going to make it last just as long as possible. In other words, we try to prolong the life of the car and to keep it in a good operating condition by performing required preventive maintenance services. Our goal then, is to learn all we can about the preventive maintenance service required to keep the darning and overedging sewing machine in a satisfactory operating condition.

II. Review.

The darning machine employs the same principle as the medium duty sewing machine, as far as preventive maintenance services are concerned. The overedger sewing machine is different than any of the sewing machines used thus far, it employs the self-lubricating system. This system utilizes an oil filler cup at the top of the machine, which leads to an oil cooler. From here the oil overflows to the base of machine. When the machine is in operation, the oil is picked up by an agitator and is splashed on the connection rods and drive shafts. The agitator also splashes the oil into various tubes or troughs. Attached to these troughs are a system of wicks, which lead to the feeding assemblies. With this type of system there must be a method to determine the oil level in the base of the machine. For this purpose, a sight gauge is used that can be seen at an instant glance to determine if the machine has sufficient amount of oil. (The oil must be up even with the red line in the sight gauge).

III. References.

TM 10-3530-203-10
TM 10-3530-203-24

IV. Performance Standards. Use these standards to check the accuracy of your performance.

A. Components and machine wiped clean before lubricating and excess lubricants wiped off after lubricating.

B. No points missed of lubricants or checking.

C. No "flooding" of parts or points.

D. Safety precautions followed.

E. Overedge machine - Oil up to the line in sight gauge (not under line nor over line).

F. Entries made on DA Form 2404.

V. Operator's Maintenance.

A. Preventive Maintenance Services. (Fig 117) To insure that the overedging machine is ready for operation at all times, its components must be inspected systematically so that defects may be discovered and corrected before they result in serious failure or damage. Defects discovered during operation of the machine should be noted for future correction. Try to make corrections immediately, or if this is not possible, as soon as the operation of the machine has ceased. Stop operation immediately if a deficiency is noticed which, if continued, would damage the equipment. All deficiencies and the corrective action taken will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity. The following preventive maintenance services should be performed daily on the overedge and darning sewing machines.

1. Table Assembly - Inspect the table assembly for cut, cracked, broken, warped, or dirty table tops; for loose or missing bolts and nuts, and for loose mounting to the folding stand. Make certain the table assembly is level.

2. Machine Head - Inspect the machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mountings. Inspect the needle for broken, or excessively worn point, for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed. Check knives on overedger for sharpness or for being broke, chipped, loose, or for adjustment.

3. Lamp Assembly - Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and for loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electric cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.

4. Thread Unwinder - Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.

5. Drive Belt and Pulleys - Inspect for broken, frayed, or excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken

edges, and loose mounting. Check for 1/4" finger-pressure depression midway between pulleys.

6. Electric Motor - Inspect the motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose vibration during operation.

7. Folding Stand - Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor. (The folding stand is normally found on the clothing repair trailer).

8. Starting Treadle - Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine.

9. Motor Switch - Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switch box. Check the switch for improper operation and make certain it turns the motor on and off.

B. Lubricants Used.

1. L.O. (Lubricating Oil, general purpose) used to lubricate each friction point of the sewing machine in accordance to instructions of the lubrication chart.

2. G.A.A. (Grease, automotive, and artillery) used to lubricate the motor of the sewing machine in accordance to instructions of the lubrication chart.

C. Lubrication of Darning Machine.

1. Sewing hook and pad - Every time a full bobbin is replaced.

2. Machine head - Every four working hours.

3. Face - Every four working hours.

4. Motor - Every 250 working hours.

5. Machine bed - Every four working hours.

D. Lubrication of Overedger Machine.

1. Oil sight gauge - Every four hours check the oil sight gauge and maintain the oil level at the midpoint of the gauge (up to red line).

2. Drain oil reservoir once every 100 hours and refill with fresh oil. Drain oil by tilting the machine head, raise the pulley end up to drain.

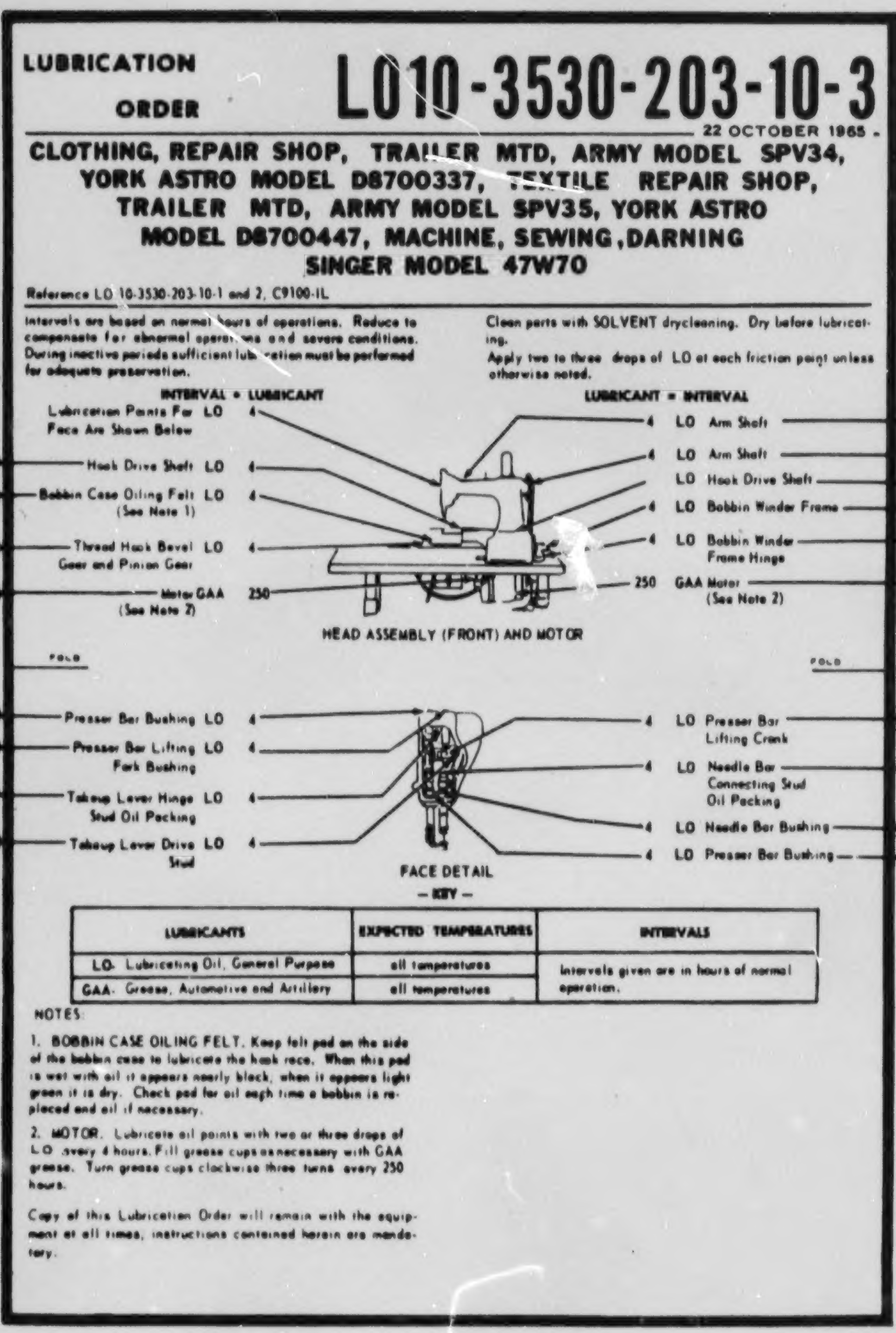
3. Motor - Every 250 hours, lubricate the oil points with two or three drops of lubricating oil. Turn the grease cup clockwise three (3) turns and fill as necessary.

E. Safety Precautions.

1. Before making adjustments, the operator must turn the motor switch to the OFF position or remove the drive belt before he removes needle, bobbin, cutters, or perform other adjustments which bring his fingers under the needle. Otherwise, he may accidentally start the machine by stepping on the foot treadle pedal and injure hands or fingers.

2. While operating the machine, the operator must keep the area of the drive belt clear of shears, ripping knives or any other item.

3. Be aware of frayed wires or loose connections as this could cause serious injury to you.



LUBRICATION ORDER **LO10-3530-203-10-3**

22 OCTOBER 1965

CLOTHING, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV34, YORK ASTRO MODEL D8700337, TEXTILE REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV35, YORK ASTRO MODEL D8700447, MACHINE, SEWING, DARNING SINGER MODEL 47W70

Reference LO 10-3530-203-10-1 and 2, C9100-IL

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean parts with SOLVENT drycleaning. Dry before lubricating.

Apply two to three drops of LO at each friction point unless otherwise noted.

FIG. 47

INTERVAL • LUBRICANT

Lubrication Points For Face Are Shown Below LO 4

① Hook Drive Shaft LO 4

② Bobbin Case Oiling Felt LO 4 (See Note 1)

③ Thread Hook Bevel Gear and Pinion Gear LO 4

⑨ Motor GAA 250 (See Note 2)

LUBRICANT • INTERVAL

4 LO Arm Shaft ④

4 LO Arm Shaft ⑤

LO Hook Drive Shaft ⑥

4 LO Bobbin Winder Frame ⑦

4 LO Bobbin Winder Frame Hinge ⑧

250 GAA Motor (See Note 2) ⑩

HEAD ASSEMBLY (FRONT) AND MOTOR

FOLD

FOLD

⑪ Presser Bar Bushing LO 4

⑫ Presser Bar Lifting Fork Bushing LO 4

⑬ Takeup Lever Hinge Stud Oil Packing LO 4

⑭ Takeup Lever Drive Stud LO 4

4 LO Presser Bar Lifting Crank ⑮

4 LO Needle Bar Connecting Stud Oil Packing ⑯

4 LO Needle Bar Bushing ⑰

4 LO Presser Bar Bushing ⑱

FACE DETAIL

— KEY —

LUBRICANTS	EXPECTED TEMPERATURES	INTERVALS
LO- Lubricating Oil, General Purpose	all temperatures	Intervals given are in hours of normal operation.
GAA- Grease, Automotive and Artillery	all temperatures	

NOTES:

1. BOBBIN CASE OILING FELT. Keep felt pad on the side of the bobbin case to lubricate the hook race. When this pad is wet with oil it appears nearly black, when it appears light green it is dry. Check pad for oil each time a bobbin is replaced and oil if necessary.

2. MOTOR. Lubricate oil points with two or three drops of LO every 4 hours. Fill grease cups as necessary with GAA grease. Turn grease cups clockwise three turns every 250 hours.

Copy of this Lubrication Order will remain with the equipment at all times, instructions contained herein are mandatory.

Figure 112 Lubrication Order 10–3530–203–10–3 for darning machine.

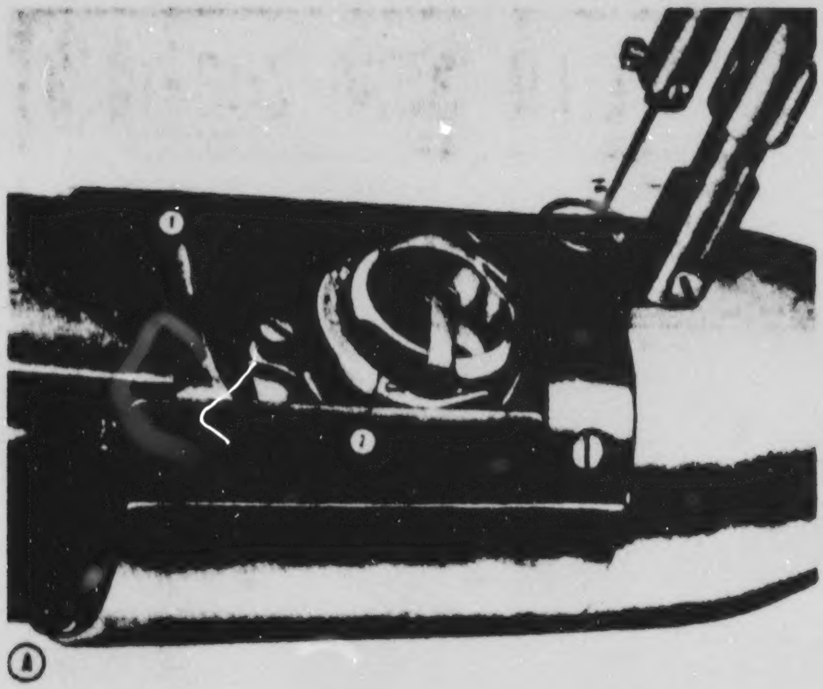


Figure 113 . *Lubrication points on darning machine.*

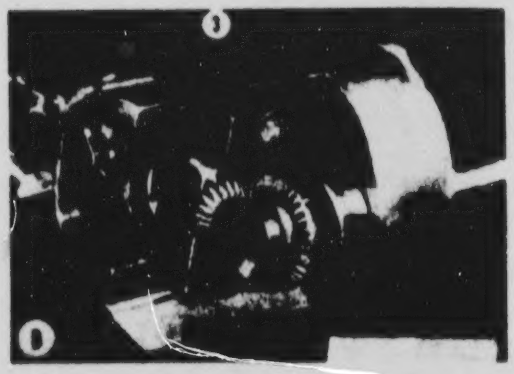


Figure 114 . -- Continued.

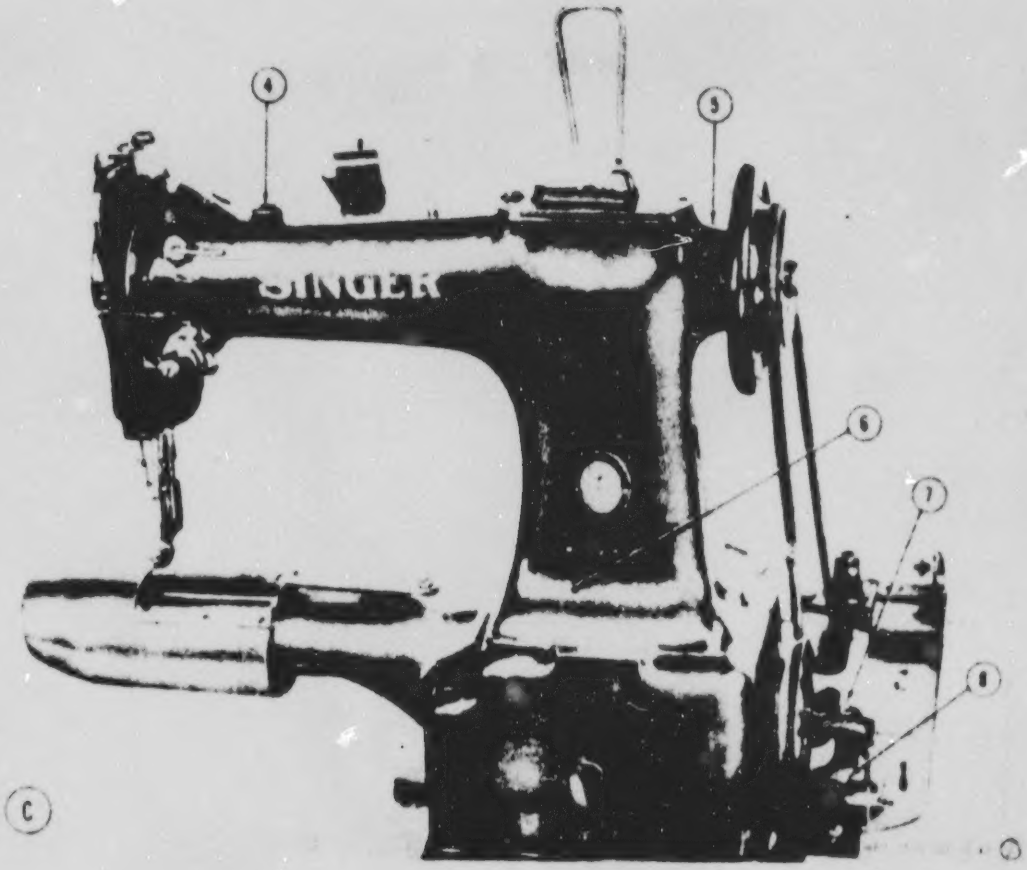

4
5
SINGER
6
7
8
C

Figure 115 - Continued.

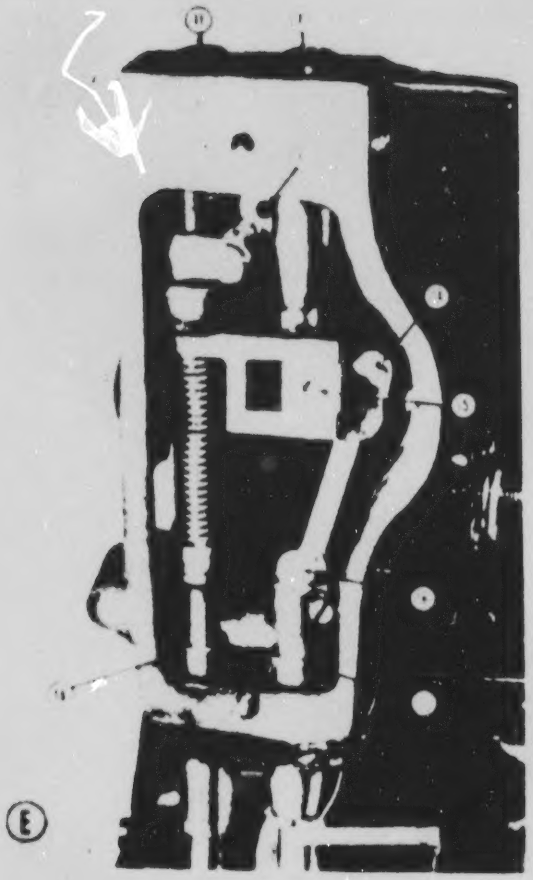
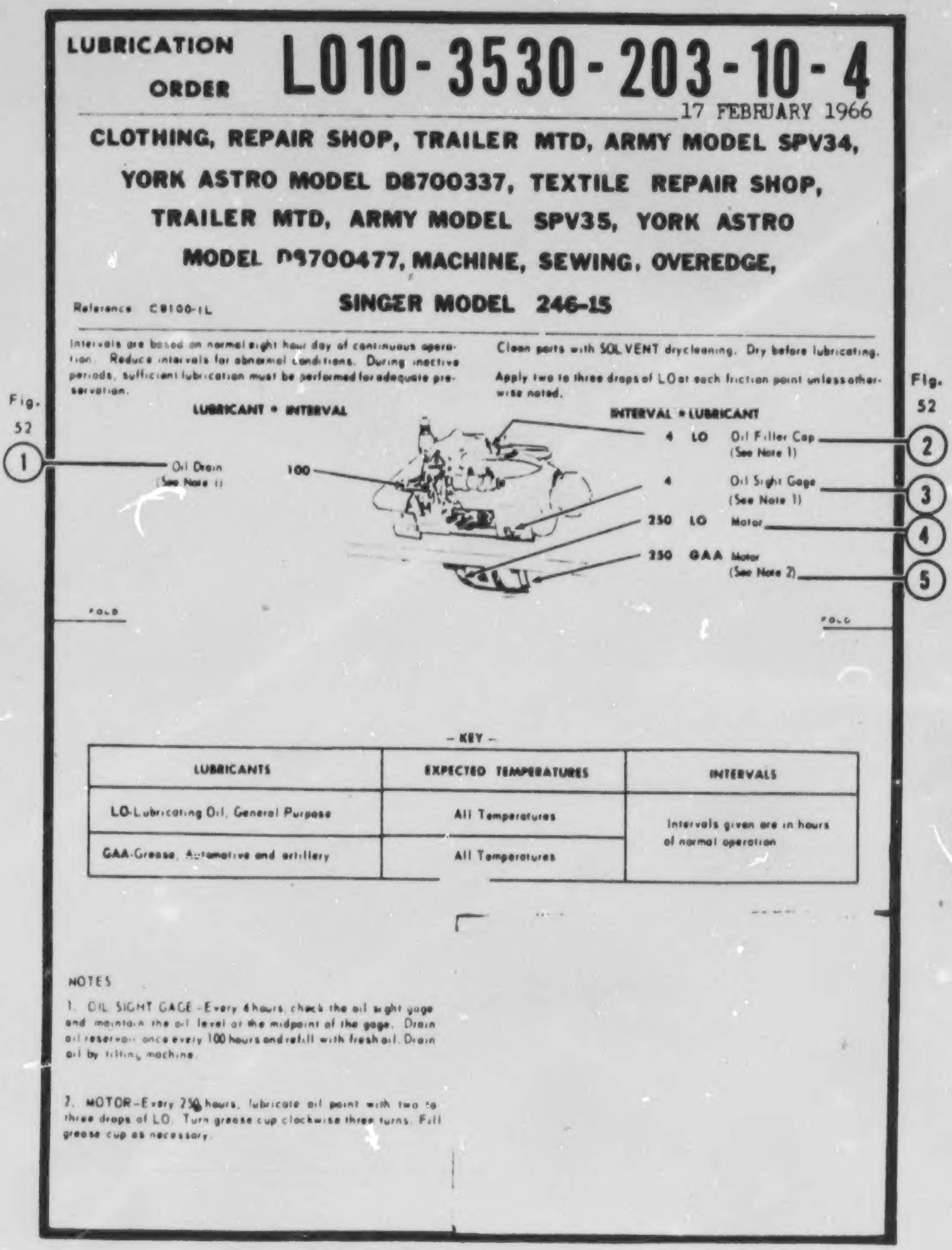


Figure 116. — Continued.



LUBRICATION ORDER **LO10-3530-203-10-4**

17 FEBRUARY 1966

CLOTHING, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV34, YORK ASTRO MODEL D8700337, TEXTILE REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV35, YORK ASTRO MODEL D8700477, MACHINE, SEWING, OVEREDGE, SINGER MODEL 246-15

Reference C8100-IL

Intervals are based on normal eight hour day of continuous operation. Reduce intervals for abnormal conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean parts with SOLVENT drycleaning. Dry before lubricating.

Apply two to three drops of LO at each friction point unless otherwise noted.

Fig. 52
LUBRICANT • INTERVAL
① Oil Drain (See Note 1) 100
Fig. 52
INTERVAL • LUBRICANT
4 LO Oil Filler Cap (See Note 1) ②
4 Oil Sight Gage (See Note 1) ③
250 LO Motor ④
250 GAA Motor (See Note 2) ⑤
FOLD
FOLD

– KEY –

LUBRICANTS	EXPECTED TEMPERATURES	INTERVALS
LO-Lubricating Oil, General Purpose	All Temperatures	Intervals given are in hours of normal operation
GAA-Grease, Automotive and artillery	All Temperatures	

NOTES

1. OIL SIGHT GAGE–Every 4 hours, check the oil sight gage and maintain the oil level at the midpoint of the gage. Drain oil reservoir once every 100 hours and refill with fresh oil. Drain oil by tilting machine.

2. MOTOR–Every 250 hours, lubricate oil point with two to three drops of LO. Turn grease cup clockwise three turns. Fill grease cup as necessary.

Figure 117. *Lubrication Order 10–3530–203–10–4 for overedge sewing machine.*

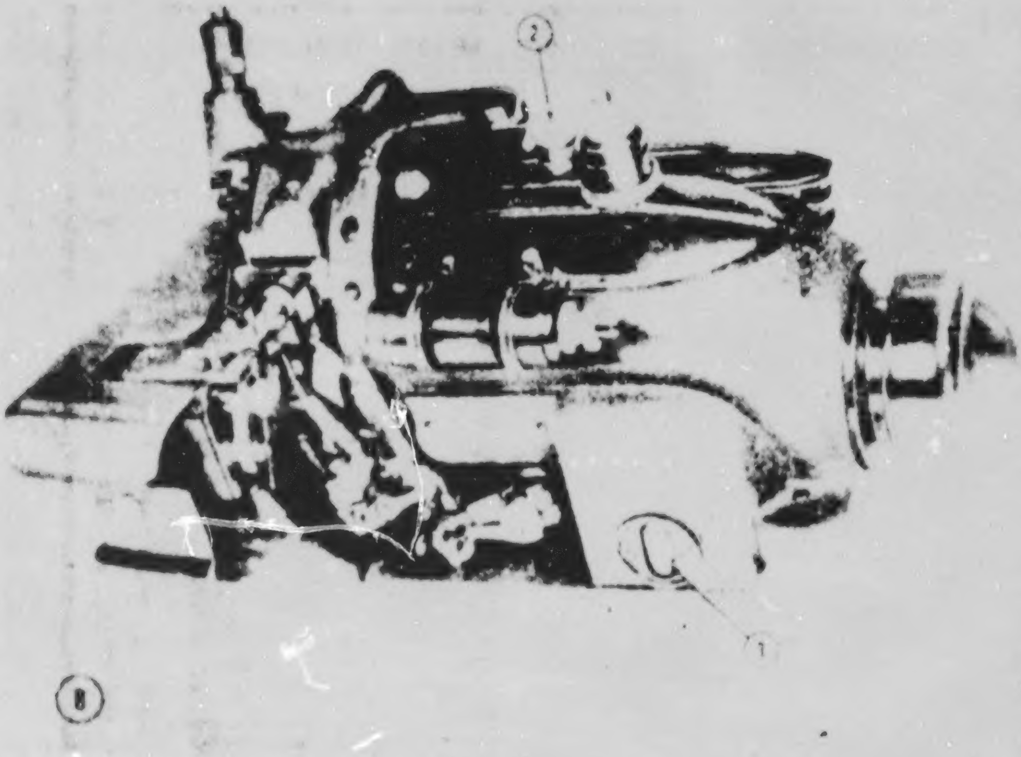


Figure 118.

815

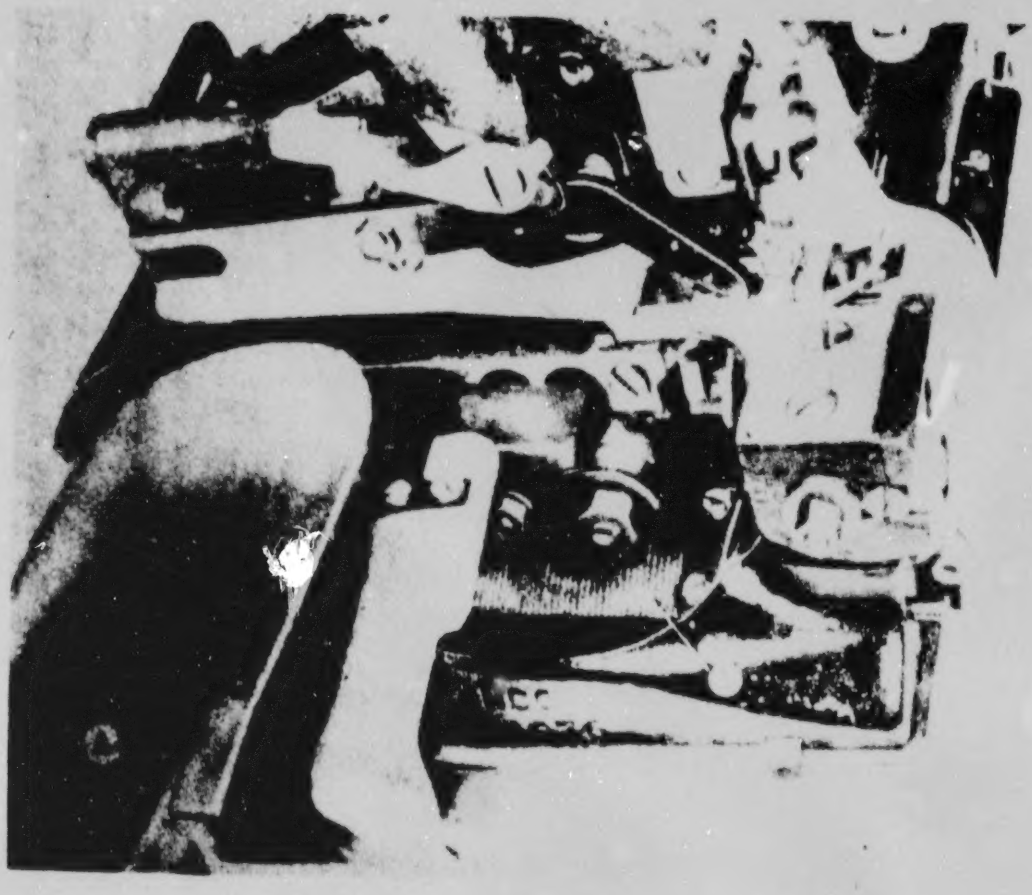


Figure 119. Lubrication points on overedge sewing machine.

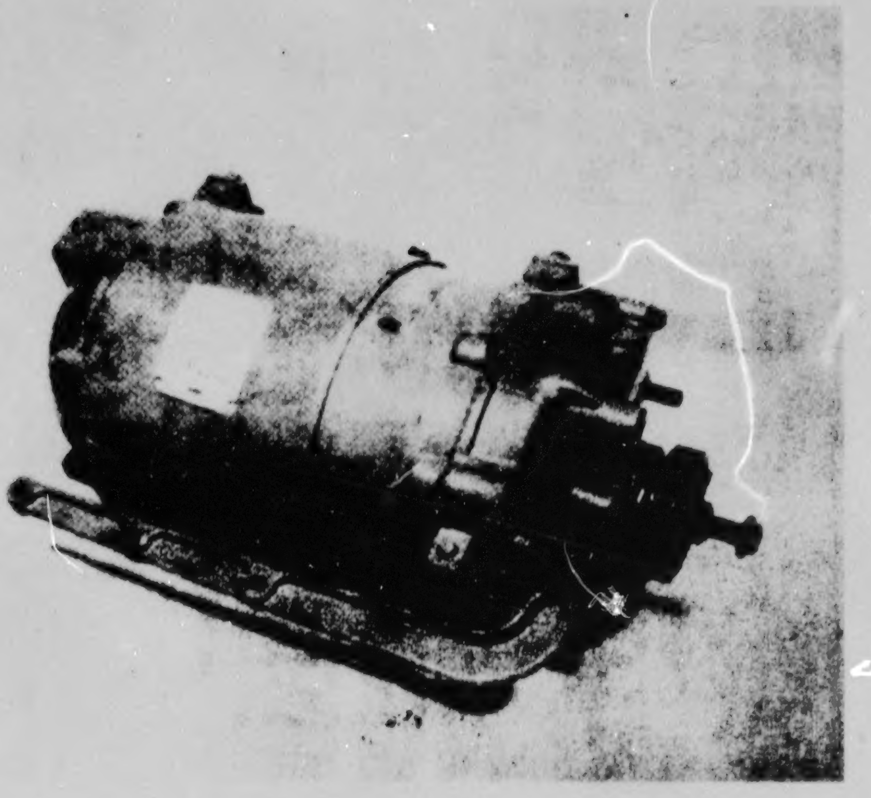
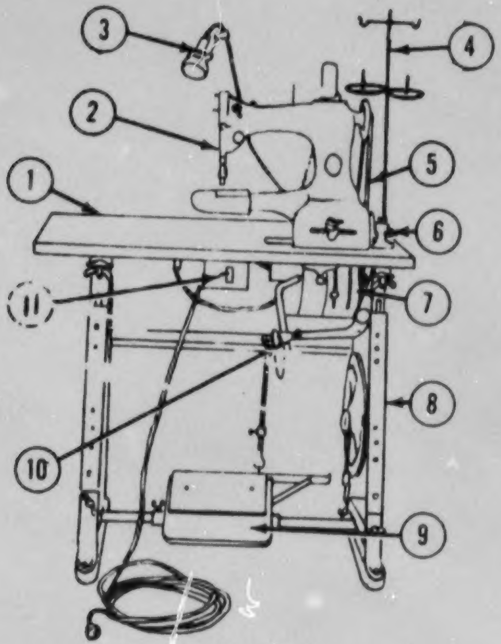


Figure 120 Motor and Clutch assembly.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 10-3530-203-10 MACHINE, DARNING



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.	

Figure 121.

ITEM		PAR REF
2	DARNING MACHINE HEAD. Inspect the darning machine head for dirty surfaces and grease deposits; for bent, broken, loose, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting.	
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and for loose mounting. Inspect for a dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and for loose mounting. Check for a 3/4-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components, and for loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	

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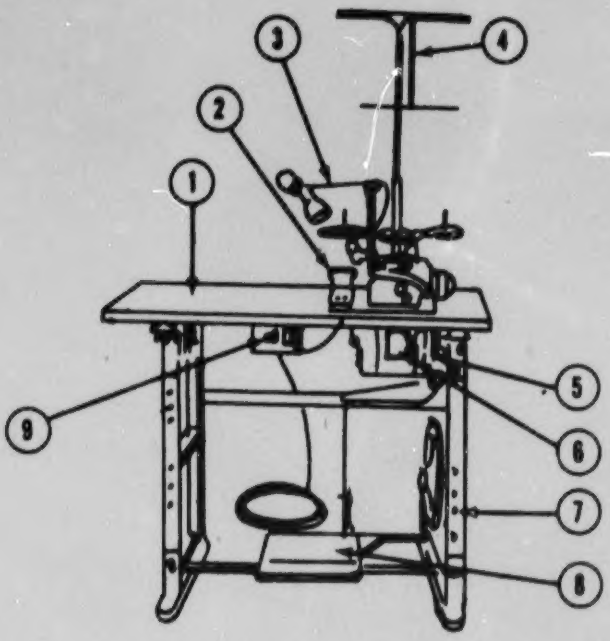
ITEM		PAR REF
8	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
9	STARTING TREADLE. Inspect the treadle for bent, broken, or loose components, and loose mounting. Operate the treadle to see that the pulley brake lever engages the motor drive pulley with the drive motor when the treadle is depressed. Make certain the pulley brake lever disengages the drive pulley from the motor and stops the pulley when the treadle is released (during operation).	
10	KNEE LIFTER. Inspect the knee lifter for bent, broken, loose, or missing components, and for loose mounting. Operate the knee lifter to see that it raises and lowers the presser foot.	
11	MOTOR SWITCH. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off. NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 10-3530-203-10 MACHINE, SEWING, OVEREDGE



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level.	

Figure 122.

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ITEM		PAR REF
2	MACHINE HEAD. Inspect the machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point, for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed.	
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for 1/4-inch finger-pressure deflection midway between pulleys.	
6	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	
7	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
8	STARTING TREADLE. Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine.	

ITEM		PAR REF
9	MOTOR SWITCH. Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switchbox. Check the switch for improper operation; make certain it turns the motor on and off. NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	

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QMS 244.15 L/PG

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-3 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Preparation for Operation of Heavy Duty Machine, Model 7-33

TYPE: Programed Instruction, Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Heavy Duty Sewing Machine, Model 7-33; Bobbin; Thread; Needle; Tool Kit; QMS 244.15 L/PG {Student Learning and Performance Guide}

TRAINING AIDS: Thread and Needle Chart Handout; QMS 244.W1, Part I, Section XV

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 66, Para 29; QMS 244.W1, Canvas and Webbed Repair, Part I, August 72, Section XV

STUDY ASSIGNMENT: Recommended: QMS 244.W1, Part I, Sec XV, Pgs. 15.01-15.12.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

LESSON TITLE: Preparation for Operation of Heavy Duty Machine, Model 7-33

YOUR OBJECTIVE: As a result of this instruction, given learning and performance guide; appropriate references; heavy duty sewing machine, model 7-33; bobbin; thread; needle; and tool kit, you will be able to prepare model heavy duty sewing machine for operation in accordance with standards prescribed in TM 10-3530-203-10, Para 29 and QMS 244.W1, Part I, Section XV.

INTRODUCTION: This is the first of six machines which you may be required to operate in order to perform future job tasks in your duty assignment. This is one of the larger machines. It was selected as the first machine because the parts are larger and therefore should be easier to see and manipulate. In order to operate this machine, you must first learn to correctly wind a bobbin, thread the bobbin case, install a machine needle, and thread the machine. If any of these procedures are done incorrectly, the machine will not sew properly. In addition, damage could result to the machine as well as to the material on which you're sewing.

DIRECTIONS:

1. For this lesson, you are to read Section XV, pages 15.01 - 15.11 in QMS 244.W1, Part I. Perform as directed, following each step in sequence and referring continually to the figures referred to in parentheses. You will need the following items:

   a. Thread and Needle Chart Handout.

   b. Heavy Duty Sewing Machine, Model 7-33.

   c. Bobbin.

   d. Thread (2 spools).

   e. Tool Kit.

   f. QMS 244.W1, Part I (Student Course Workbook).

2. First take time to read these safety precautions carefully:

   a. Be sure the motor switch is off whenever you're removing needles or bobbins or whenever you're performing adjustments which could bring your fingers under the needle. Merely stepping on the foot pedal could start the machine and injure your hands or fingers. Therefore, keep the motor switch off throughout this lesson.

b. Remember to keep your fingers or hands away from the path of the needle at all times. During this lesson, simply turning the hand wheel in order to remove and install the needle could result in an injury to your hand or fingers if you are not careful.

c. Tools can also cause injuries if improperly used or stored. Keep them far enough away from the machine to prevent their becoming entangled with machine belts, pulleys, or moving parts. Place tools so that they cannot drop from the work table and cause injuries.

3. Begin now by reading the performance standards on pages 15.01 - 15.02. NOTE: Your instructor will use these same standards to evaluate your work when you complete the exercise.

4. Perform each step in sequence. If you need help at any time, raise your hand and an instructor will assist you.

5. Recheck your work. Once again refer to figure 69, page 15.11, to check the manner in which you threaded your machine.

6. Now ask your instructor to check your work. He may direct you to do a series of steps once again to correct any incorrect procedure.

7. When the instructor is certain that you can prepare the heavy duty sewing machine, model 7-33, for operation {that is, that you can correctly wind a bobbin, thread a bobbin case, install a needle, and thread the machine}, he will sign your student progression sheet and assign your next lesson.

SECTION XV

PREPARATION FOR OPERATION, HEAVY DUTY MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope.

This instruction will enable you to prepare the sewing machine for operation by removing the bobbin case from the shuttle, threading the bobbin winder according to thread chart, winding a bobbin, threading the bobbin case by correctly placing bobbin in bobbin case, installing needle in needle bar with groove of needle to operator's left, and threading machine according to threading chart. It will be necessary for you to learn how to prepare a heavy duty sewing machine for operation because without this machine it would be impossible for you to completely fulfill your mission as a canvas and webbed repairman.

II. Reference.

TM 10-3530-203-10

III. Tools, Equipment, and Material Required.

Heavy duty sewing machine
Bobbins
Thread for machine (2 spools 10/3)
Material

IV. Performance Standards. Use these standards to check the accuracy of your work.

A. Make sure all threading points are correct.

B. Make sure bobbin is in the bobbin cylinder correctly (thread drawing off the top of bobbin).

C. Make sure cylinder is closed before sewing, and thread under spring tension correctly.

D. Make sure safety precautions are followed, especially keeping switch off while threading machine.

E. Proper amount of thread (3 inches at least) is drawn under presser foot.

F. Bobbin not round too tight or too loose, or too full.

G. Presser feet raised when winding bobbin.

H. Needle thread in needle eye from left to right.

I. Needle installed correctly with long groove to operator's left.

V. Preparation of Machine for Sewing.

A. Selecting Needle and Thread. When preparing the heavy duty sewing machine for operation, select a needle of the correct size (24 or 26) according to the size of thread, and the weight of the material. Left-twist thread must be used in the needle but the right-twist may be used on the bobbin. The thread must pass freely through the eye of the needle. Rough or uneven thread or thread which for any reason does not pass easily through the eye of the needle interferes with the operation of the machine. The class number (7) and the variety number (1) are expressed by placing the letter (x) between the two numbers; for example, 7 x 1, and the size number is listed after the class and variety such as (7 x 1, size 26). The class number describes the upper shank of the needle and the variety number describes the overall length of the needle. The size number describes the lower shank and the size of the eye.

B. Installing the Needle. Use a good needle (never a bent or one with dull or a blunt point) of suitable size for the material. Turn the machine drive wheel (balance wheel) forward (to the operator), until the needle bar is at its highest point. Loosen the clamping screw at the lower end of the needle bar, and remove the needle. Install the needle through the needle clamp and tighten the clamp screw. Make sure that the long groove of the needle is to the operator's left.

C. Removing the Bobbin. (Refer to Fig 65)

1. Place the needle in lowest position by turning the balance wheel towards operator until the needle bar is at its lowest position.

2. Remove the wood bed cover plate.

3. Open bobbin case. Insert the special tool (opener) for the machine or the blade of a screwdriver in the shuttle cylinder opener slot. Bobbin will drop free from cylinder.

4. Close cylinder after removing bobbin to keep cylinder from breaking off.

D. Winding the Bobbin. (Refer to Figs 66 and 67)

1. Slide bobbin into bobbin winder spindle as far as bobbin will go, make sure that small pin on spindle shaft shoulder enters hole in bobbin rim.

2. Thread one of the holes in the left-hand bobbin rim, pass thread from unwinder tension disks through hole.

3. Push bobbin winder stop latch into position against bobbin, making sure friction pulley presses firmly against balance wheel.

4. Raise presser feet to avoid wear on feed dogs.

5. Hold end of thread until a few coils are wound around bobbin, then break off the end as close to bobbin rim as you can. Run machine at a slow rate of speed until bobbin is filled and the thread on the bobbin comes in contact with the stop latch.

6. If necessary, adjust tripping arm clamping screw to vary the amount of thread wound on the bobbin, to do this, loosen screw and push stop latch closer to or farther away from bobbin axle.

NOTE: If bobbin is wound too full it will cause the bobbin not to turn freely in the cylinder and bobbin thread will break.

E. Installing the Bobbin. (Refer to Fig 68)

1. Place needle bar in lowest position.

2. Open the cylinder, place bobbin in cylinder; hold bobbin with thread drawing off the top to the operator's left.

3. Draw thread into tension spring slot, leave about 4 inches of thread. Then close cylinder.

F. Threading the Heavy Duty Sewing Machine. (Refer to Fig 69).

1. Pass the thread from the thread cone, up and over the thread unwinder eyelet.

2. Thread the first thread guide from right to left.

3. Thread the oil cup, pass thread from right to left through the hole on right side of cup. Pass the thread from right to left

through the oil cup stud. Pass the thread out through the slot in the left side of cup. Close the oil cup cover.

4. Thread the second thread guide from right to left.

5. Thread the needle thread tension assembly making sure thread slides between the tension disks.

6. Thread the thread regulator, pull the thread down from tension assembly.

7. Thread the thread take-up spring, pass the thread up through the spring.

8. Place thread under thread take-up spring staple, the thread take-up spring must be threaded first.

9. Thread the thread take-up lever, pull thread up from take-up spring staple.

10. Thread the thread regulator thread guide, pass the thread down through the eyelet.

11. Thread the vibrating presser bar, pass the thread through the slot from left to right.

12. Thread the needle bar thread guide, pass the thread down through the guide.

13. Thread the needle eye from left to right only.

14. Pass thread through the hole in the lifting presser foot.

15. Hold needle thread end and turn balance wheel toward operator and at same time slacken needle thread until needle has gone through its lowest position and to its highest position. Then, pull needle thread tight, this will pick up bobbin thread and you will be ready for sewing.

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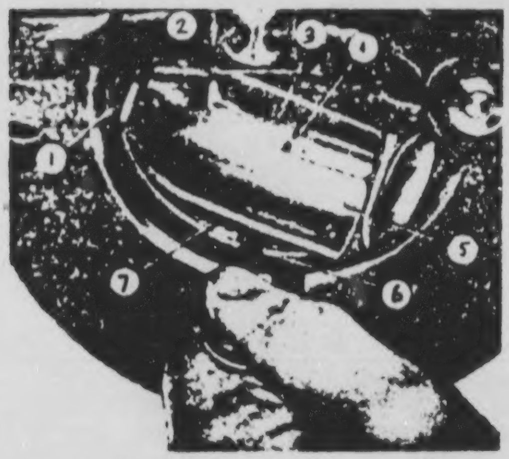
NOTE: Before sewing, pull threads under presser foot.

16. Pull both threads until at least 3 inches of thread is drawn under and behind the presser foot. This allows enough thread for the shuttle hook to draw around the bobbin to make the first stitch and lock it into the material being sewn.



① Shuttle cylinder hinge
② Shuttle tension regulating screw
③ Shuttle tension spring
④ Bobbin thread delivery eye
⑤ Shuttle cylinder
⑥ Shuttle cylinder opener
⑦ Shuttle cylinder latch

Figure 65. *Removing bobbin.*

NOTE: ORIGINAL PAGE 218 HAS BEEN OMITTED; HOWEVER ALL MATERIAL HAS BEEN INCLUDED.

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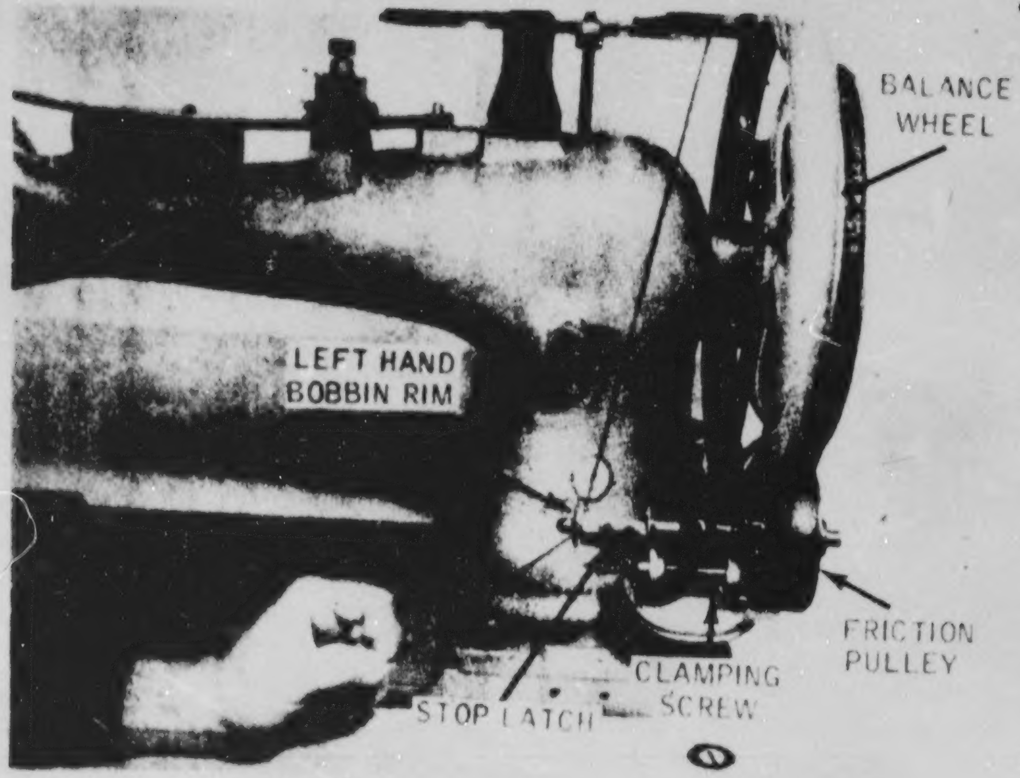
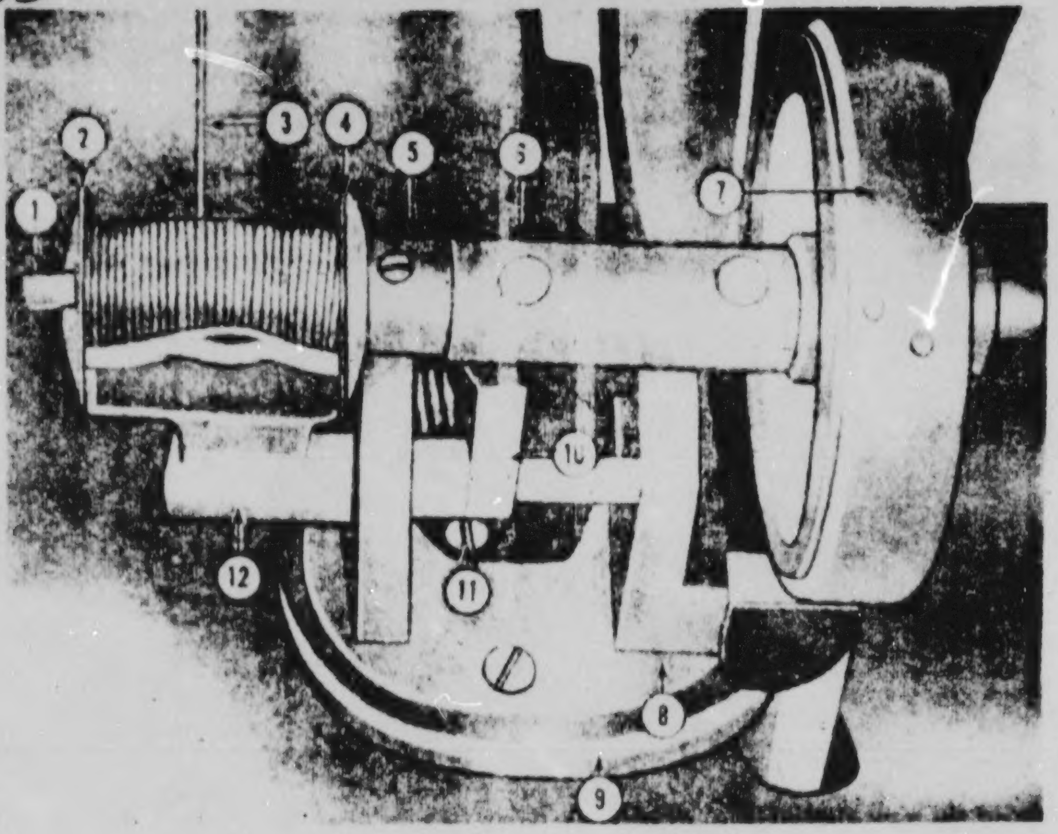

BALANCE WHEEL
LEFT HAND BOBBIN RIM
FRICTION PULLEY
CLAMPING SCREW
STOP LATCH

Figure 66. Winding the bobbin.



1 Spindle
2 Rim, left-hand bobbin
3 Stand, thread-from-thread
4 Rim, right-hand bobbin
5 Shoulder, shaft
6 Frame
7 Ring, friction pulley
8 Base
9 Bracket
10 Arm, tripping
11 Screw, tripping arm clamping
12 Latch, stop

Figure 67. Winding bobbin on heavy duty sewing machine.

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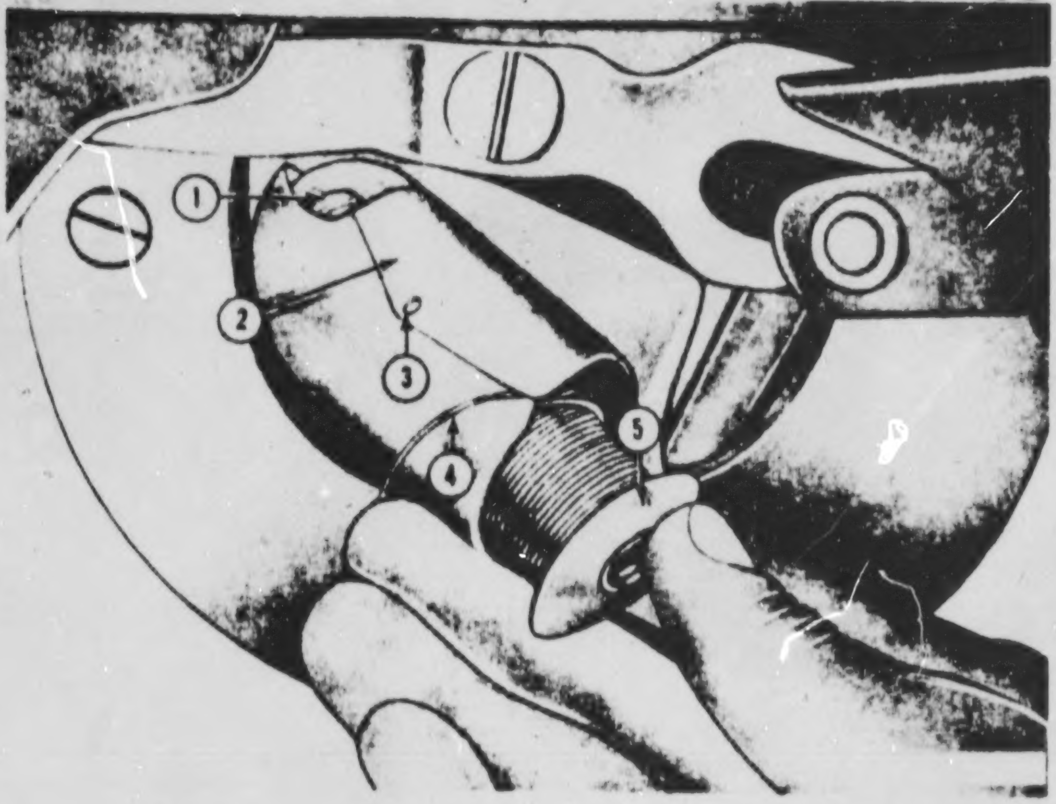

1 Spring, shuttle tension regulating spring
2 Spring, shuttle tension
3 Eye, bobbin thread delivery
4 Thread (in spring slot), bobbin
5 Bobbin

Figure 68. Installing bobbin in heavy-duty sewing machine.

835

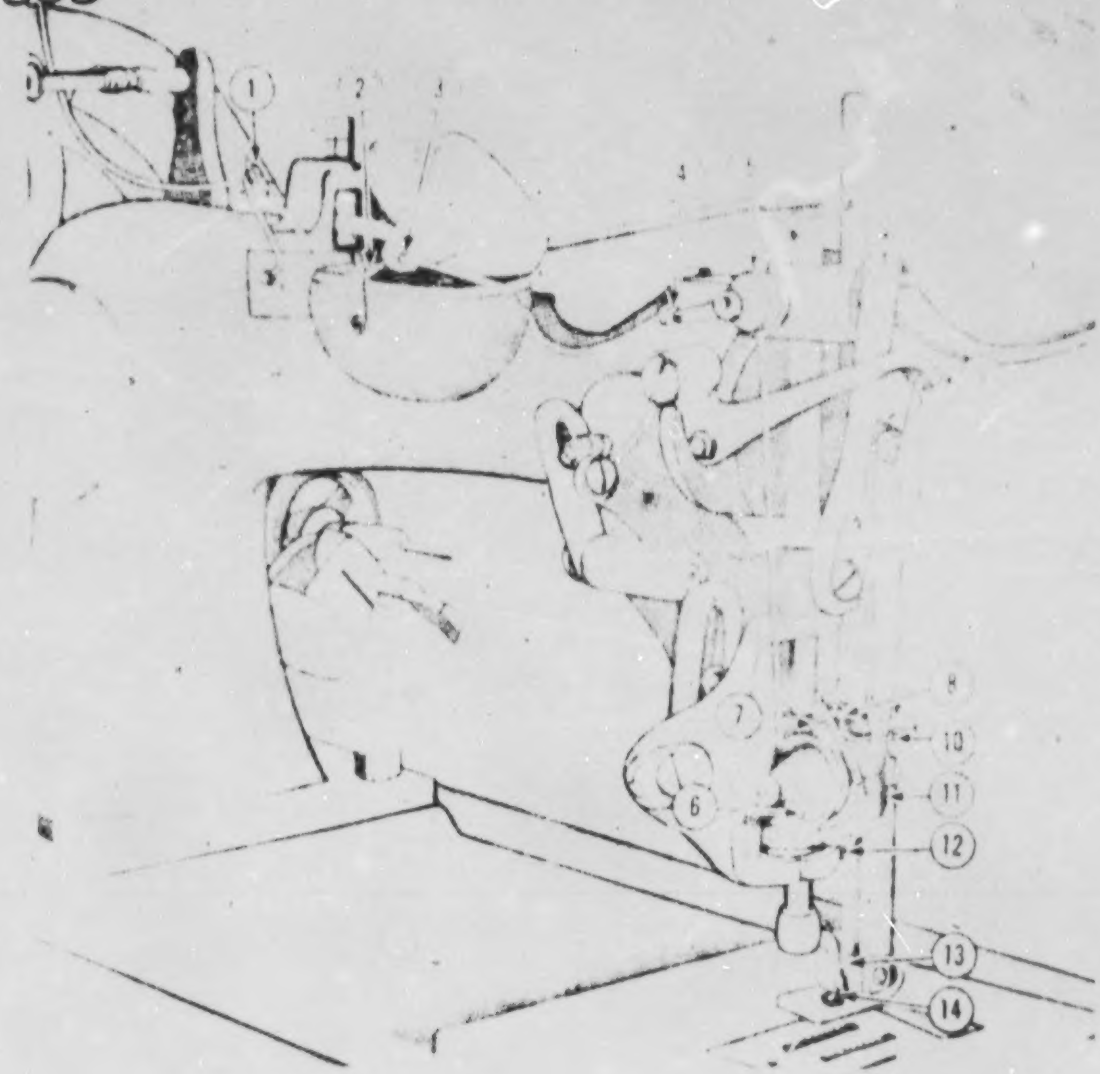

Figure 69. Threading points.

1 Thread guide
2 Oil cup hole
3 Oil cup stud
4 Thread guide
5 Tension assembly
6 Thread regulator
7 Thread takeup spring
8 Thread takeup spring staple
9 Thread takeup lever

10 Thread guide
11 Vibrating presser bar slot
12 Thread guide
13 Needle eye

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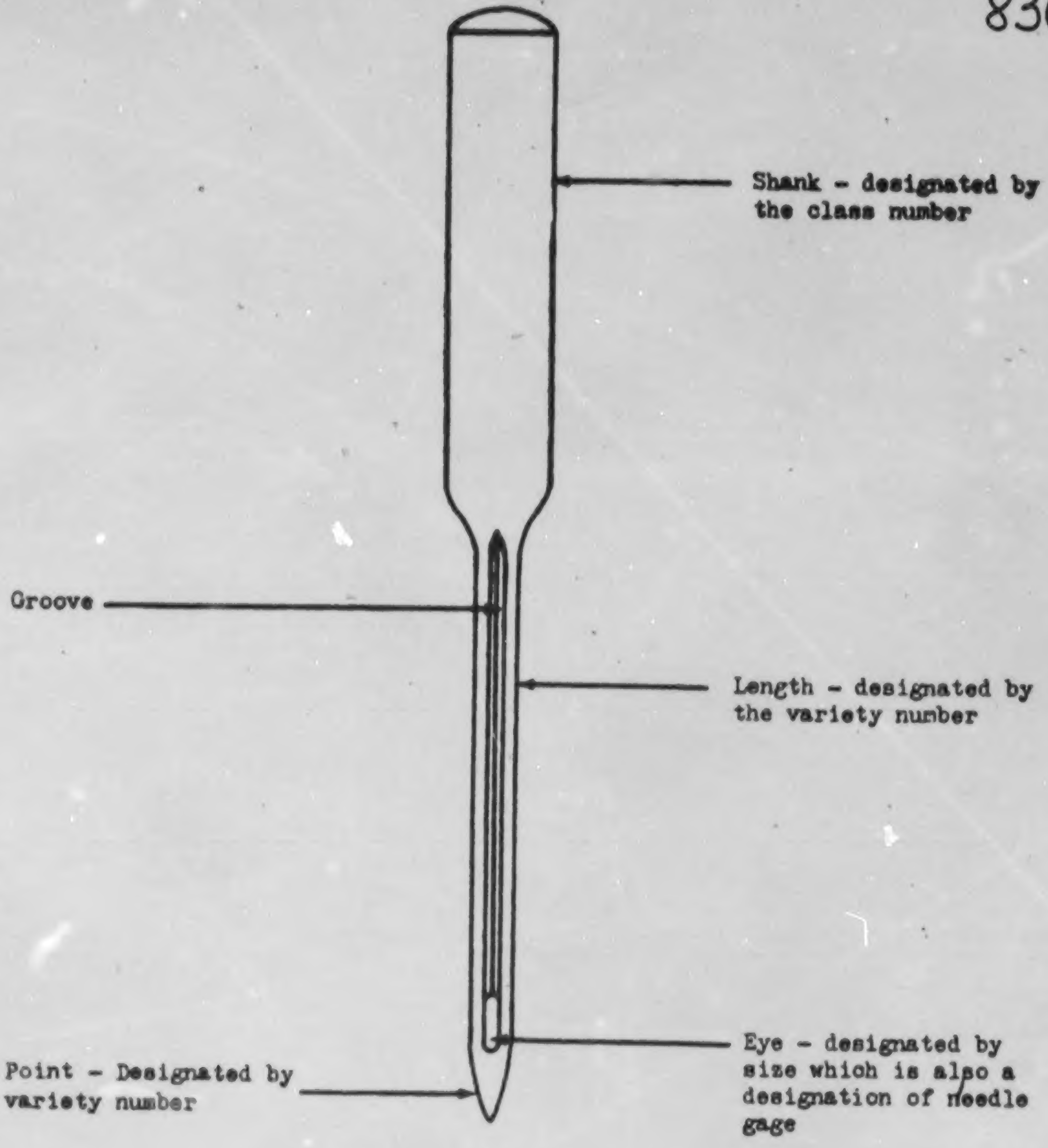
Shank - designated by the class number
Groove
Length - designated by the variety number
Eye - designated by size which is also a designation of needle gage
Point - Designated by variety number

NEEDLE

Figure 70.

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QMS 244.16 L/PG

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-4 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Cleaning Shuttle Race Assembly, Heavy Duty Machine, Model 7-33

TYPE: Programed Instruction and Practical Exercise Hardware

TOOLS, EQUIPMENT AND MATERIALS: Heavy Duty Sewing Machine, Tool Kit, Solvent Compound, Sash Brush, Rags, Cleaning and Lubricating Materials

TRAINING AIDS: QMS 244.W1, Part I, Sec XVI

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 66, Para 53 & 54; TM 10-3530-203-24, Organizational and Maintenance Manual, Textile Repair Shop, June 66, Para 3-75; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Aug 72, Sec XVI

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part I, Sec XVI, Pgs 16.01-16.14.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

JAN 30 1975

LESSON TITLE: Cleaning Shuttle Race Assembly, Heavy Duty Machine, Model 7-33

YOUR OBJECTIVE: As a result of this instruction, given learning and performance guide, appropriate references, heavy duty sewing machine (model 7-33), tool kit, solvent compound, sash brush, rags, and cleaning and lubricating materials, you will be able to disassemble, clean, oil, and reassemble shuttle race assembly of heavy duty sewing machine in accordance with standards prescribed in QMS 244.W1, Part I, Section XVI.

INTRODUCTION: Because the shuttle race assembly requires more maintenance service than any other sewing machine assembly, it is important that you learn how to disassemble it for cleaning and lubrication. Located under the material being sewn, the shuttle race assembly collects lint and thread as well as dirt. These not only cause unnecessary wear to the parts which compose the assembly but they also cause the machine to malfunction as the shuttle jams. Cleaning and lubrication both remove these causes of malfunction and add to the life of the assembly.

DIRECTIONS:

1. For this lesson you will be performing as directed in QMS 244.W1, Part I, Section XVI, Pages 16.01-16.14. You will need the following items:

   a. Heavy Duty Sewing Machine, Model 7-33.

   b. Tool Kit.

   c. Solvent Compound.

   d. Sash Brush.

   e. Rags.

   f. Cleaning and Lubrication Materials.

   g. QMS 244.W1, Part 1.

2. SAFETY PRECAUTIONS: DISCONNECT POWER CORDS OR TURN OFF THE POWER SOURCE BEFORE BEGINNING MAINTENANCE OPERATIONS.

3. Read the performance standards on pages 16.01-16.02. NOTE: Your instructor will use these same standards to evaluate your work at 4 different checkpoints. At each of these 4 checkpoints, raise your hand and an instructor will evaluate your work.and, if correct, initial the box on this page.

4.

☐ Disassemble the shuttle race assembly by following directions A1 - A8. Refer repeatedly to illustrations on pages 16.05 through 16.09. Raise your hand to have an instructor check your work.

☐ Clean and oil the shuttle race assembly as directed in B1 - B3 {page 16.03}. Have an instructor check your work.

☐ Reassemble and install the shuttle race assembly by following directions C1 - C5 {pages 16.03 - 16.04}. Each step is illustrated and explained in detail on pages 16.10 - 16.12. NOTE: When inserting the shuttle race back, hold the part so that the flat side is to your left and the side on which the points have been shaved down or beveled is to your right. This part can be put in incorrectly. However, it would cause the machine to grab the thread and break the thread. If put in incorrectly, you will be required to again disassemble and reassemble the entire shuttle race assembly.
It will be to your advantage to repeat the entire series of steps descrihed on pages 16.10 - 16.12 at least twice.
Have an instructor check your work.

☐ Perform as directed in step 6 and step 7 {page 16.13}. If the cloth plate and throat plate screws are not tightened, machine vibration will strip the screws or the plate could come loose and break the needle bar. In addition,the material could be damaged.

5. Have the instructor sign your student progression sheet. He will then direct you to your next lesson.

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SECTION XVI

CLEANING SHUTTLE RACE ASSEMBLY, HEAVY DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope.

Instruction in this section will enable you to remove the shuttle race assembly as outlined in TM 10-3530-203-24, thoroughly clean all parts with cleaning solvent, reassemble the shuttle race assembly according to TM 10-3530-203-24, lubricate the shuttle race according to detailed lubrication instructions, and correctly replace shuttle race assembly in the machine. This section of instruction provides you with the skill of removing the shuttle race assembly, for the purpose of cleaning and lubricating the parts as this will prolong the assembly's life. This assembly is the most important assembly in the machine, and requires more maintenance service than the other assemblies, because it is under the material being sewn and will collect lint, dirt and thread, which must be removed. If you allow this condition to exist it will jam the shuttle or cause unnecessary wear to the shuttle race assembly.

II. References.

TM 10-3530-203-10
TM 10-3530-203-24

III. Performance Standards. Use these standards to check your performance.

A. Use tools properly and the right tool for the job performed.

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B. Layout of parts in proper sequence as you are disassembling the shuttle race.

C. All dirt and lint is cleaned from assembly.

D. Assembly properly lubricated.

E. Shuttle race assembled properly.

F. Assembly installed in machine properly.

G. Throat plate and cloth plate screws tightened.

IV. Cleaning Shuttle Race Assembly.

A. Disassembly of the Shuttle Race Assembly of the Heavy Duty Sewing Machine.

1. Remove cloth plate screws and plate. Lift plate up and off.

2. Remove throat plate screws and plate. Lift plate up and off.

3. Remove shuttle race back spring screw and spring. Turn balance wheel towards operator until the needle bar connecting link is at its top stroke. At this time, the heel of the shuttle is at the top. Turn screw to the left to remove. Turn shuttle race back spring to right side and pull down on spring.

4. Remove screws in shuttle race body. Make sure screwdriver is at correct angle so that heads of screws will not be damaged. Be sure to remove both screws.

CAUTION: Do not drop shuttle and body. Shuttle is fragile and will break if dropped.

5. Remove shuttle race. Hold race with left hand and remove

shuttle race back off dowel pins. Place right hand on shuttle as in figure, and pull down on race and then pull out.

6. Remove shuttle cylinder. Hold cylinder with right hand. Place fingers of left hand on point of cylinder and remove shuttle cylinder.

7. Remove shuttle race back. Pull back to left and off shuttle driver.

8. Lay out all parts in sequence in which they were disassembled and removed.

B. Cleaning of the Shuttle Race Assembly.

1. After the shuttle race has been disassembled, dip the component parts of the shuttle race assembly in solvent compound and use a sash brush to thoroughly remove dirt and grit from the parts.

2. After the parts have been cleaned, use rags to wipe the excess solvent from the parts.

3. Before assembling the parts, inspect for nicks and burrs and apply a light coating of oil to the surface of the parts.

4. Reassemble the shuttle race assembly in reverse order of disassembly.

C. Reassembly of the Shuttle Race Assembly (Heavy Duty Machine).

1. Insert the shuttle race back. When replacing the shuttle race assembly, the machine head cannot be tilted back. Work performed must be done from underneath the table. Needle bar connecting link must be in its highest position. Beveled side of end of back will be facing operator's right. Slide the back over the shuttle driver and

against the casting of the machine. Back will stay in place.

2. Replace shuttle cylinder. Heel of shuttle cylinder is placed up against shuttle driver. Hold cylinder with index finger and thumb of right hand.

3. Replace shuttle race. Take race with left hand and slide up on inside of feed bar. Make sure point of shuttle body is inserted in shuttle race. Replace shuttle race screws.

4. Place shuttle race back holes over dowel pins and up against race. Make sure dowel pins are aligned with holes and seated flush with race. (Race conceals back in illustration).

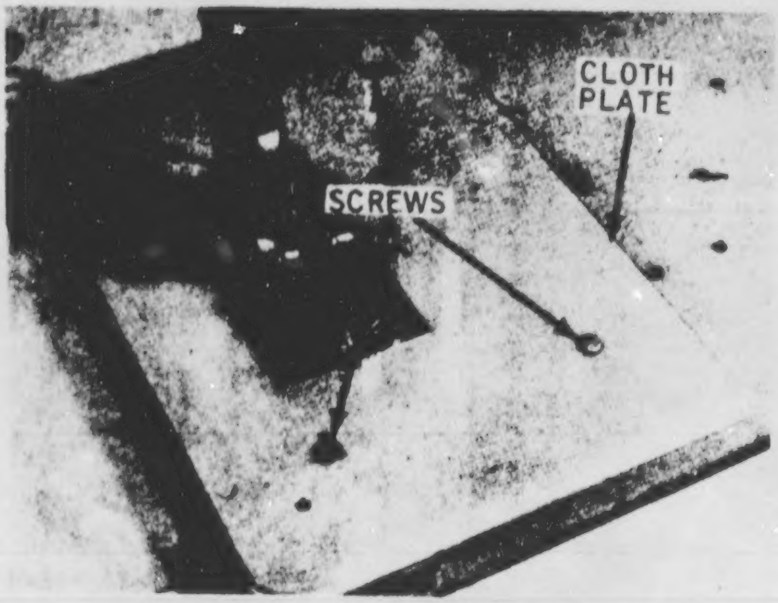
5. Replace shuttle race back spring and screw. Make sure shuttle race back is inserted on dowel pins. Fingers of spring must be in between the opposite dowel pins. Insert screw and tighten.

6. Replace throat plate screws.

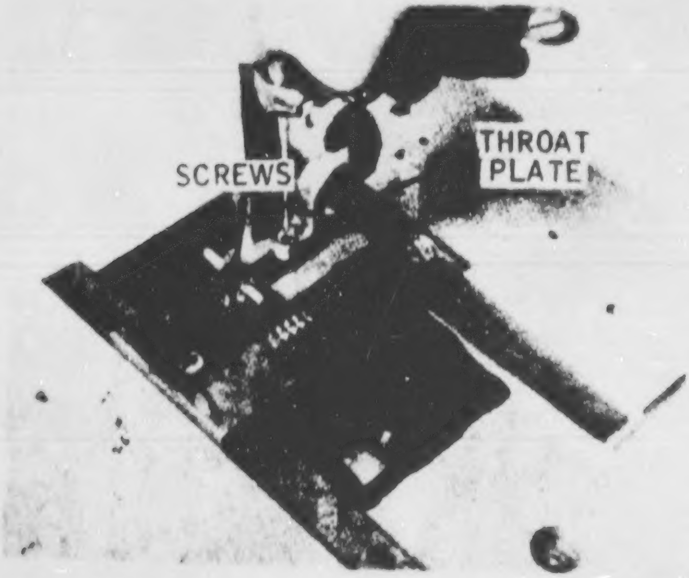
7. Replace cloth plate and screws. Tighten the four screws evenly. Replace door of stand.

D. Safety Precautions.

Disconnect power cords or turn off the power source while performing maintenance operations on the sewing machine.


CLOTH PLATE
SCREWS

Step 1. Remove cloth plate screws and plate.
Lift plate up and off.


SCREWS
THROAT PLATE

Step 2. Remove throat plate screws and plate.
Lift plate up and off.

Figure 71. Disassembly Shuttle Race Assembly

SHUTTLE RACE
BACK SPRING
SCREW

Step 8. Remove shuttle race back spring screw and spring. Turn balance wheel towards operator until the needle bar connecting link is at its top stroke. At this time, the heel of the shuttle is at the top. Turn screw to the left to remove. Turn shuttle race back spring to right side and pull down on spring.

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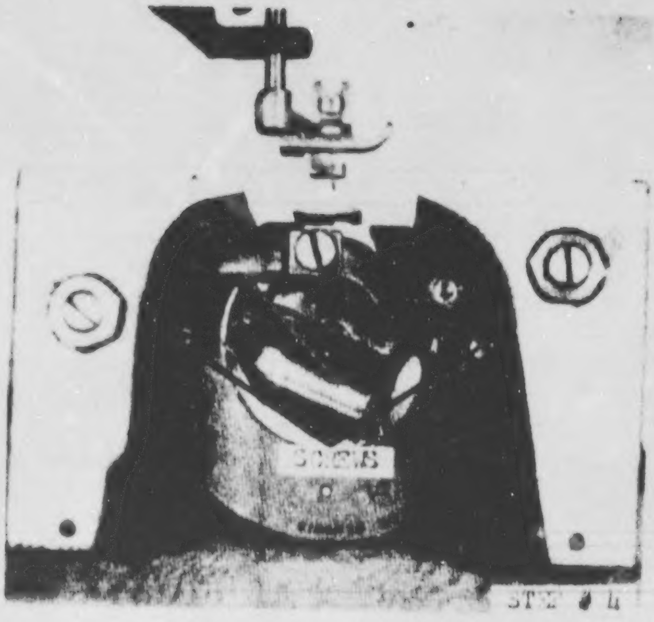
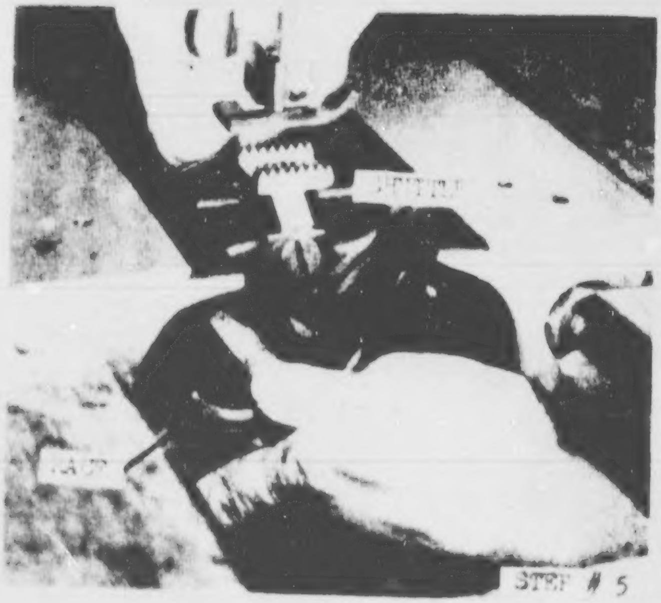
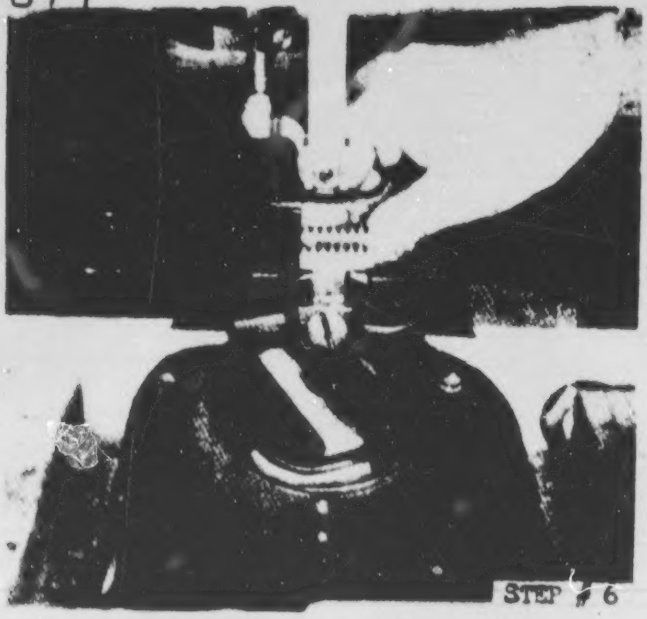


Step 4. Remove screws in shuttle race body. Make sure screwdriver is at correct angle so that heads of screws will not be damaged. Be sure to remove both screws.

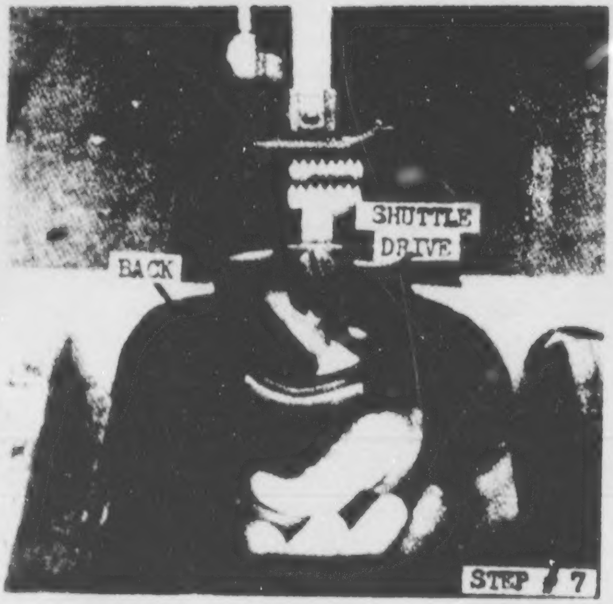
CAUTION: Do not drop shuttle and body. Shuttle is fragile and will break if dropped.



Step 5. Remove shuttle race. Hold race with left hand and remove shuttle race back off dowel pins. Place right hand on shuttle as in figure, and pull down on race and then pull out.



Step 6. Remove shuttle cylinder. Hold cylinder with right hand. Place fingers of left hand on point of cylinder and remove shuttle cylinder.


SHUTTLE DRIVE
BACK
STEP # 7

Step 7. Remove shuttle race back. Pull back to left and off shuttle driver.

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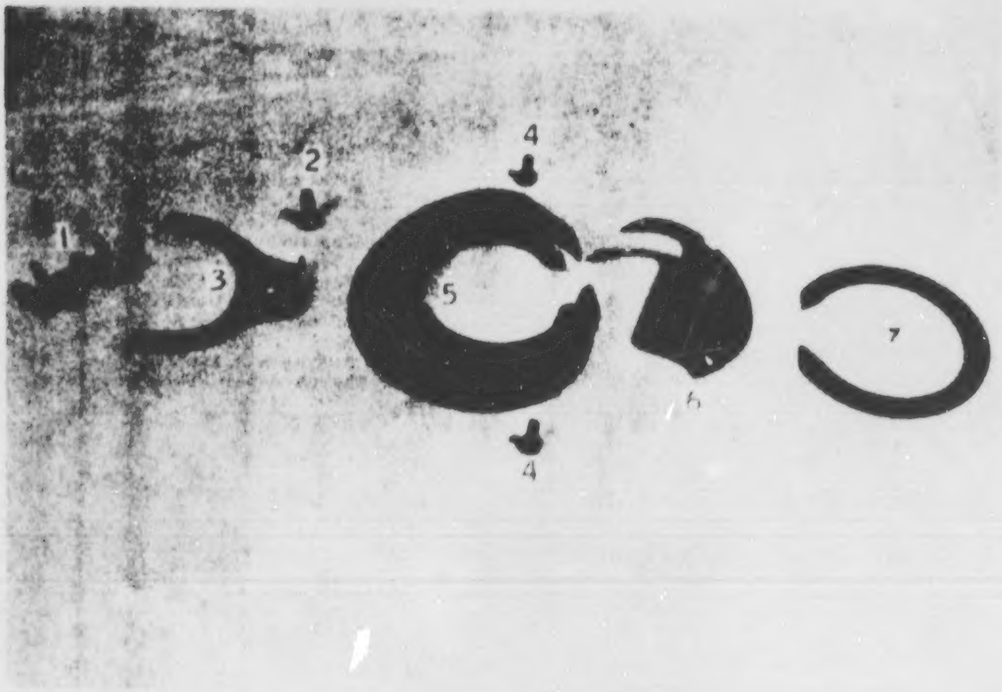

Figure 72. Shuttle race and cylinder, disassembled.

1. Bobbin
2. Screw, shuttle race back spring.
3. Shuttle race back, spring.
4. Screws, shuttle race.
5. Race assembly, shuttle.
6. Cylinder, shuttle.
7. Back, shuttle race.

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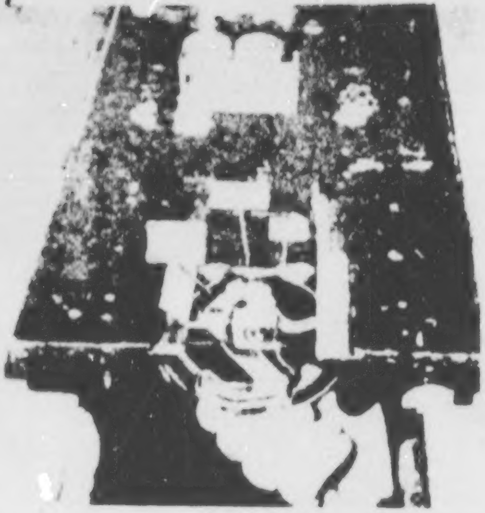
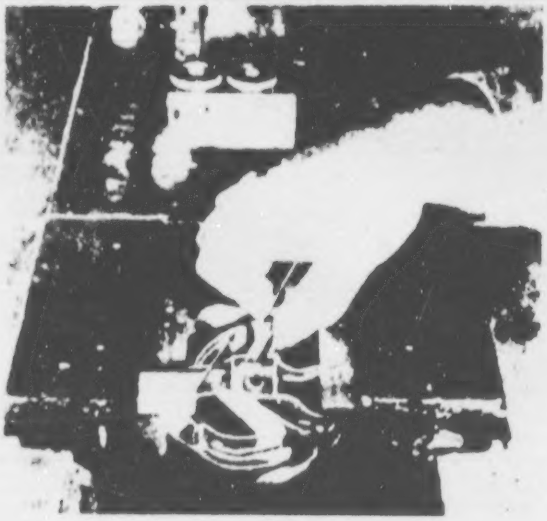


Figure 73 Assembly of shuttle race assembly of model 7-33 sewing machine.

Step 1. Insert shuttle race back. When replacing the shuttle race assembly the machine head cannot be tilted back. Work performed must be done from underneath the table. Needle bar connecting link must be in its highest position. Beveled side of end of back will be facing operator's right. Slide the back over the shuttle driver and against the casting of the machine. Back will stay in place.



Step 2. Replace shuttle cylinder. Heel of shuttle cylinder is placed up against shuttle driver. Hold cylinder with index finger and thumb of right hand.

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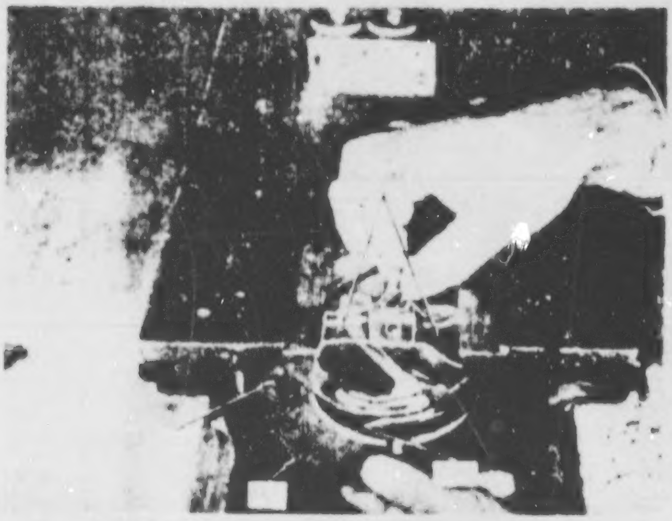
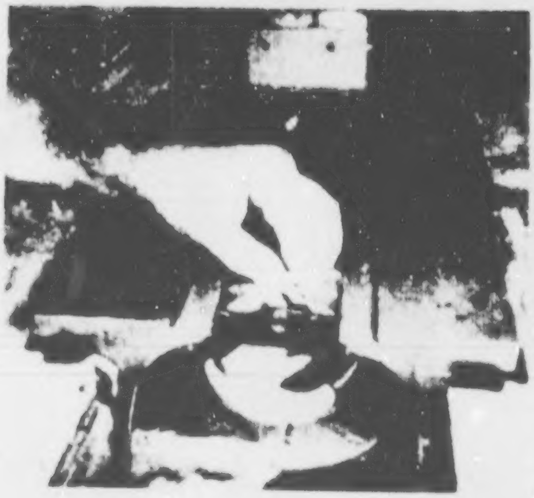


Step 3. Replace shuttle race. Take race with left hand and slide up on inside of feed bar. Make sure point of shuttle body is inserted in shuttle race. Replace shuttle race screws.



Step 4. Place shuttle race back holes over dowel pins and up against race. Make sure dowel pins are alined with holes and seated flush with race. (Race conceals back in illustration.)

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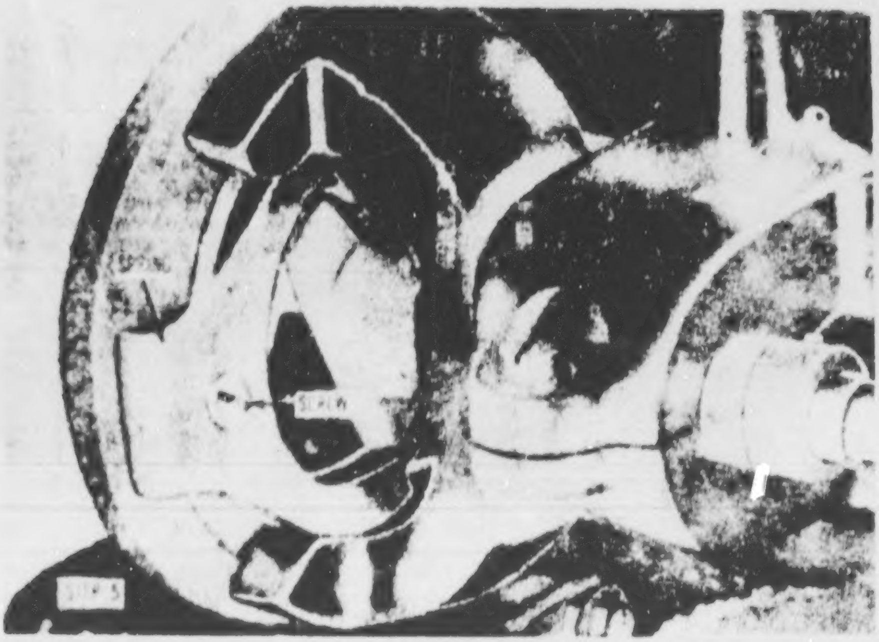
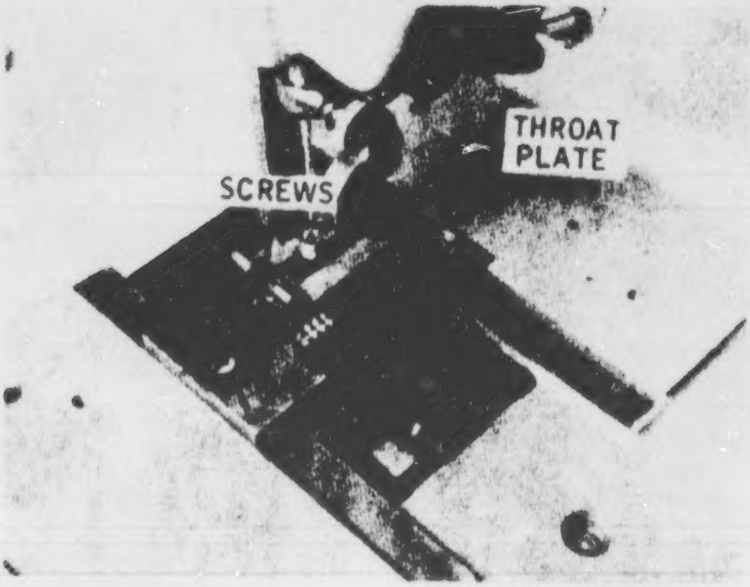
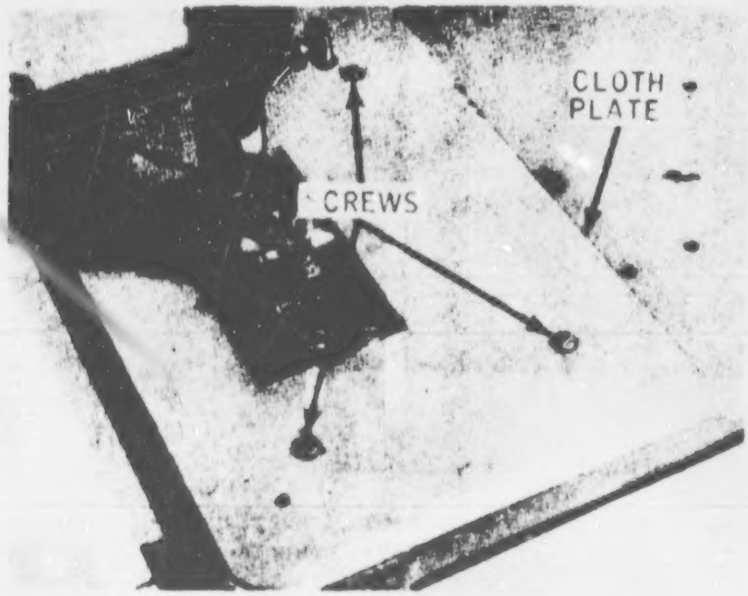


Step 5. Replace shuttle race back spring and screw. Make sure shuttle race back is inserted on dowel pins. Fingers of spring must be in between the opposite dowel pins. Insert screw and tighten.


THROAT
PLATE
SCREWS

Step 6. Replace throat plate and screws.


CLOTH
PLATE
SCREWS

Step. 7. Replace cloth plate and screws. Tighten the four screws evenly. Replace door of stand.

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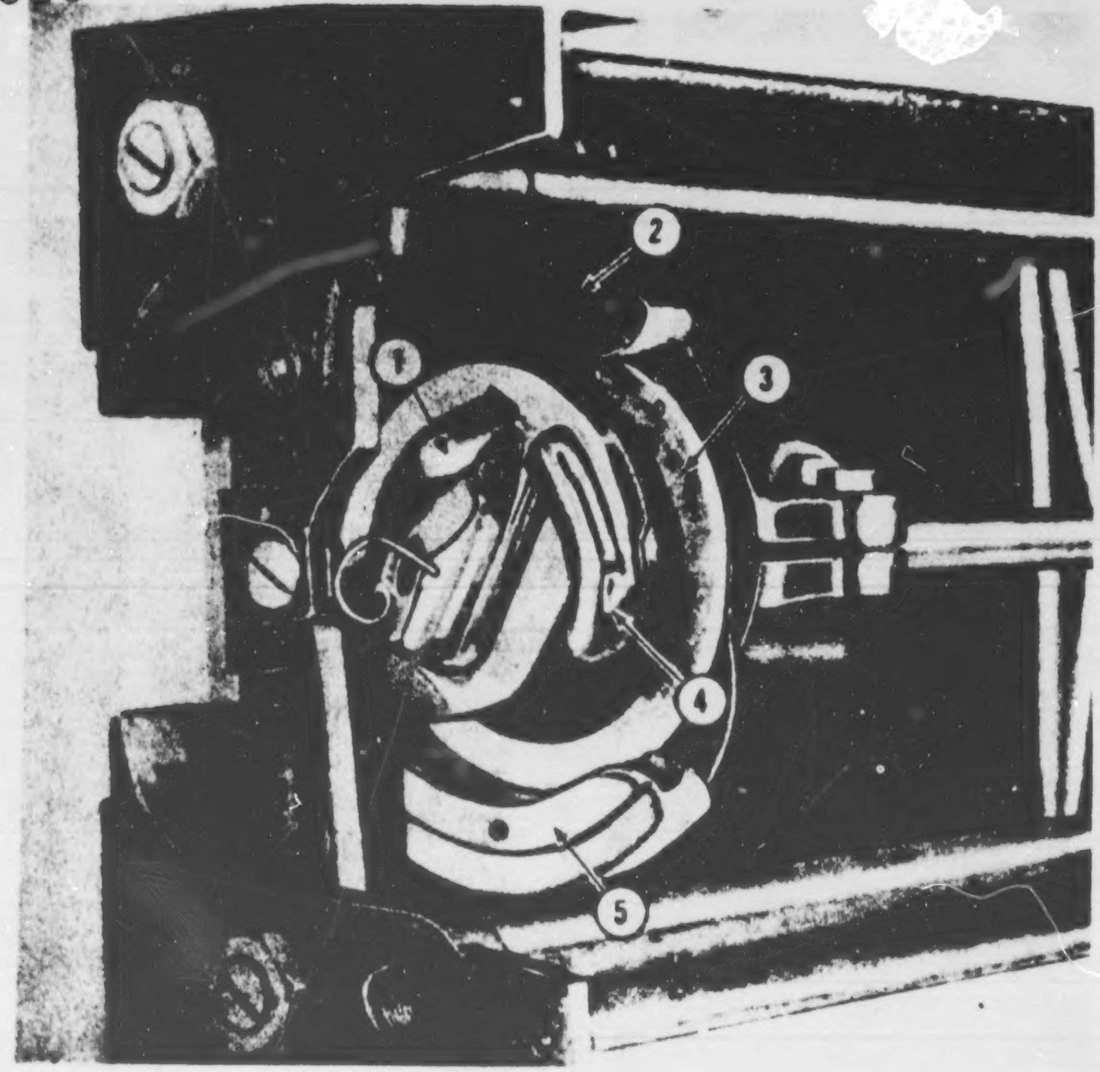

Figure 74 Shuttle Cylinder, Installed.

1. Cylinder assembly, shuttle
2. Frame, shuttle race
3. Back, shuttle race
4. Drive, shuttle
5. Race assembly, shuttle

QMS 244.17 L/PG 854

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-5 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Adjustment and Operation of Heavy Duty Machine, Model 7-33

TYPE: Programed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT AND MATERIALS: Heavy Duty Sewing Machine, Tool Kit, Salvaged Canvas Material, Cleaning and Lubricating Materials, QMS 244.17 L/PG

TRAINING AIDS: QMS 244.Wl, Part I, Sec XVII and Heavy Duty Sewing Machine, Model 7-33

REFERENCES: TM 10-3530-203-10, Operator s Manual, Textile Repair Shop, Trailer-Mounted, April 66, Para 29-30 & 31; TM 10-3530-203-24, Organizational and Maintenance Manual, Textile Repair Shop, June, Para 3-77; QMS 244.Wl, Canvas and Webbed Equipage Repair Course, Part I, Aug 72, Sec XVII

STUDY ASSIGNMENT: Recommended: Read QMS 244.Wl, Part I, Sec XVII, Pgs 17.01 - 17.18.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.Wl, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

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LESSON TITLE: Adjustment and Operation of Heavy Duty Machine, Model 7-33

YOUR OBJECTIVES: As a result of this instruction, given this learning and performance guide, appropriate references, QMS 244.Wl Part I, heavy duty sewing machine {model 7-33}, tool kit, salvaged canvas material, and cleaning and lubricating materials, you will be able to operate and adjust model heavy duty sewing machine in accordance with standards prescribed in QMS 244.Wl, Part I, Section XVII.

INTRODUCTION: Your machine is not stitching properly. It may be skipping stitches, breaking stitches, locking stitches at the top or bottom of the material and not in the center, or not locking stitches at all. It may be sewing in the same spot or not sewing at all. If it is sewing, the stitches may be too long, too short, too loose, or too tight. Then too, the thread may keep breaking or jaming up under the throat plate. If that's not enough, the needle may break. As an operator you will be required to perform operator's maintenance, including adjustments practiced in this lesson which may correct these and other possible malfunctions. In your next assignment, these and other malfunctions will be prearranged and you will be expected to perform those adjustments needed to correct them.

DIRECTIONS:

1. Though the order in which you will be directed to perform this adjustment and operation exercise has been slightly rearranged, you will be following the directions in QMS 244.Wl, Part I, Section XVII, Pages 17.01 - 17.18.

2. You will need the following items:

   a. Heavy Duty Sewing Machine, Model 7-33.

   b. QMS 244.Wl, Part I {Student Course Workbook}.

   c. Tool Kit.

   d. Salvaged Canvas Material.

   e. Cleaning and Lubricating Materials.

3. Perform before and after operation maintenance service as instructed in previous instruction. CAUTION: BEFORE PERFORMING THIS OR ANY MAINTENANCE, DISCONNECT POWER CORDS!

4. If at any time you need assistance, raise your hand for an instructor.

5. Perform as directed in A, B, and D {pages 17.02 - 17.04} SKIP C AT THE MOMENT.
   For A, refer to figures 75 and 76 {pages 17.07-17.08}.
   For B, refer to figure 77 {page 17.09}
   For D, study figure 83 {pages 17.15 - 17.17}.

6. Before proceeding, you may need to re-thread the machine or wind and install a bobbin. To do so, refer again to Section XV, figures 65-69 {pages 15.07 - 15.11} or figures 79-82 {pages 17.11 - 17.14}.

7. Now perform as directed in F and G {pages 17.05 - 17.06}. If the machine is skipping stitches or not picking up stitches, reset the needle eye with the shuttle point after first disconnecting power cords. If the machine is sewing in the same spot, the presser foot pressure may be too tight. If the material doesn't feed through, the presser foot pressure may be too loose. Correct these malfunctions only after disconnecting the machine.

8. At this point, follow directions listed in C {pages 17.03 - 17.04}. Study figure 78 {page 17.10}.

9. Proceed to regulate the machine to sew from 5 to 7 stitches per inch. Follow the steps listed in E {pages 17.04 - 17.05}.

10. Perform after-operation preventive maintenance services by lubricating those areas shown in figure 84 {page 17.18}

11. When the instructor is certain that you are able to achieve your lesson objectives, meeting the standards set on page 17.02, he will sign your student progression sheet and assign your next lesson.

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SECTION XVII

ADJUSTMENT AND OPERATION OF HEAVY DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope. The instruction in this section will enable you to adjust the motor clutch pedal to achieve the correct starting and braking action of the machine, time the needle bar with the shuttle point according to timing measurements, make adjustments to the presser foot pressure, and stitch lengths according to the thicknesses of material, adjust the bobbin and needle threads according to tension charts, wind the bobbin while sewing, adjust bobbin winder and bobbin winder tension, perform "during operation" preventive maintenance services in accordance with lubrication chart and operator's PM check list, remove work from machine as stated in TM 10-3530-203-10 and TM 10-3530-203-24, and perform after operator's preventive maintenance services according to operator's PM check list and the references for this lesson. In many cases when an operator complains about his machine not sewing the way it should, or his machine is breaking thread, the machine only needs to be put into proper adjustment. A good sewing machine operator must know all the operator's adjustments. The operator should have a complete knowledge of why a certain adjustment must be made and what takes place when it is made right. As future sewing machine operators you will be able to gain this knowledge during this block of instruction.

II. References.

TM 10-3530-203-10
TM 10-3530-203-24

III. Performance Checking Standards. Use these standards to check the accuracy of your work.

A. The point of the shuttle, on its forward stroke, must pass 1/32 of an inch above the top of the needle eye.

B. Stitch locked in the center of material.

C. Presser feet must raise to an equal height.

D. Lifting presser foot must be aligned for the needle to pass through the center of it.

E. Stitch regulator must be adjusted for the machine to sew from 5 to 7 stitches per inch.

F. Ample pressure must be applied on the presser feet so material will feed properly.

G. After Operator's preventive maintenance services has been performed.

IV. Adjustment and Operation of Heavy Duty Sewing Machine.

A. Checking and Preparing Machine for Timing.

WARNING: To avoid injury to yourself, turn the motor switch to the OFF position and make sure the motor armature has stopped turning. (Hold balance wheel and step on treadle after switch is turned off).

1. Remove cloth plate screws and plate.
2. Remove throat plate screw and plate.
3. Turn balance wheel toward you, the operator, until the needle bar is at its lowest position. (Shuttle is now to the rear of the needle).

4. Turn balance wheel until the needle bar has raised 1/4 of an inch on its up stroke. The point of the shuttle should cross the center of the needle at a point 1/32 of an inch above the top of the needle eye.

B. Setting Needle Eye with the Shuttle Point. (Fig 77)

NOTE: Make sure the shuttle point is centered in the diameter of the needle.

1. Loosen the two setscrews on the needle bar connecting stud.

2. Move needle bar up or down until top of needle eye is 1/32 of an inch below the point of the shuttle.

3. Holding the needle bar so it doesn't move, tighten the setscrews on needle bar connection stud. (Recheck the timing).

4. Recheck your timing by reperforming steps 3 & 4, para IV A above.

5. Replace all components removed, and secure all screws.

C. Adjusting Tension on Bobbin and Needle Thread. (Fig 78)

Sew a row of stitches on two layers of material. If tension is correctly adjusted, the lock of the stitch will be in the center of the material. If the lock is visible from the top, your needle thread is too tight or bobbin thread is too loose. If bobbin tension is too tight or if needle thread is too loose, the lock will be along the bottom of the material. Be sure to check both.

1. Needle thread tension - Turn thumbnut from right to left to add tension and reverse for loosening tension.

2. Bobbin tension - Turning the regulating screw clockwise adds tension and counterclockwise loosens the tension.

D. Adjusting the Presser Foot Pressure. (Fig 83)

NOTE: When properly adjusted the presser foot will raise to equal height when operating.

1. Turn balance wheel until needle bar is in its highest position. (If the presser foot is adjusted correctly the bottom of the lifting presser foot will be even with the top of the vibrating presser foot.

2. Loosen the pinch screws in the lifting presser bar bracket. This will allow you to raise or lower the lifting presser foot.

3. Turn the lifting presser foot to the right and place it on top of the vibrating presser foot right side.

NOTE: This will give you the proper height for adjusting the presser foot.

4. Turn lifting presser foot to the left and center of the two toes of the vibrating presser foot without raising or lowering the lifting presser foot, then tighten the pinch screws in the lifting presser bar bracket.

NOTE: Make sure the hole in the lifting presser foot is aligned with the needle. The needle must go down in the center of the presser foot hole.

E. Adjusting Stitch Feed Regulator Thumb Screw.

1. Turn thumbscrew found in vertical arm to the left to loosen.

2. Move the feed regulator down to lengthen the stitches or up to shorten the stitches, and then tighten the thumbscrew.

F. Operating Heavy Duty Sewing Machine.

1. To insert material in machine, turn balance wheel until needle bar moves up to its highest position. Raise the presser foot, place material under presser foot, then lower presser foot. Turn balance wheel until needle is in the material.

2. Turn motor switch to the ON position.

3. Sewing material - Hand turn the balance wheel toward the operator and simultaneously hold the needle and bobbin threads until a few stitches are made. Press the treadle slowly to engage the clutch with the motor. Hold the material flat and do not pull or push on the material while sewing it or stitching it because the needle will bend, will strike the throat plate and then it will become dulled, or more likely, will break. Let the feed dog carry the material evenly under the presser foot and needle. When sewing across a seam or an unusually thick or uneven place in the material, release the treadle to disengage the clutch and hand turn the balance wheel until the rough place is stitched; otherwise, the needle may break. If the material is unusually thick, as a comforter for example, decrease the tension on the presser foot by turning the pressure regulating thumbscrew to the left.

G. Stopping the Heavy Duty Sewing Machine.

1. Release the treadle to stop the machine. Hand turn the balance wheel until the stitch is completed and the thread take-up

lever is at its highest point and then lift the presser bar lifter to raise the presser foot. Draw the material straight behind the presser foot, and cut needle and bobbin thread so that about 6 inches will be under and behind the presser foot.

2. Turn the motor switch to the OFF position.

H. Safety Precautions.

Disconnect power cords before performing any maintenance on the sewing machines and the generator set, and sew at moderate speeds, where you can control machine.

I. If you have to prepare the machine for operation (re-threading, winding bobbin, installing bobbin, etc.) and have forgotten some of the procedures, refer to Section XV, Figs 65 thru 69, and Figs 79, 80, 81, and 82 in this section.

J. Don't forget to perform "After-Operation" preventive maintenance services. (See Fig 84).

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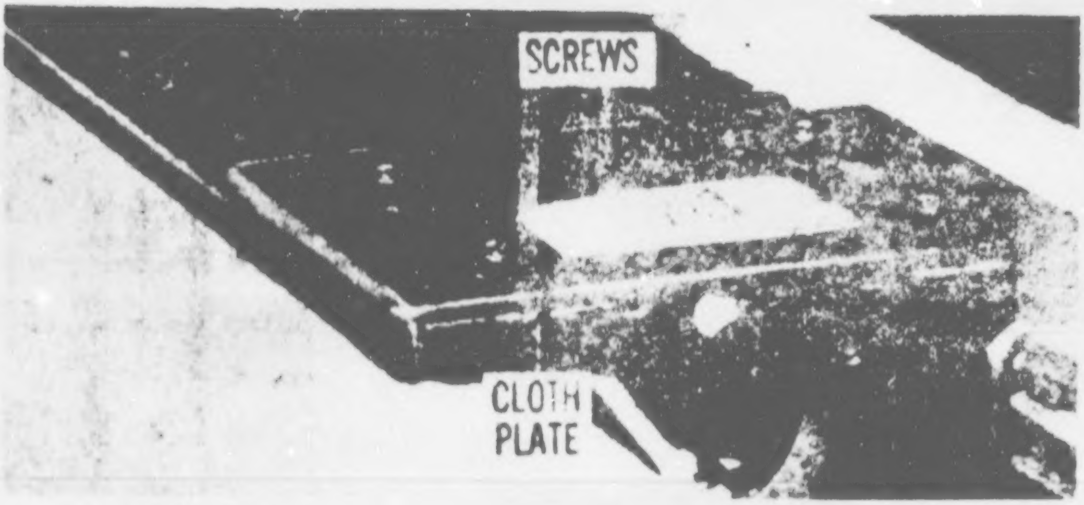

SCREWS
CLOTH PLATE

Figure 75. Screws and cloth plate.

864

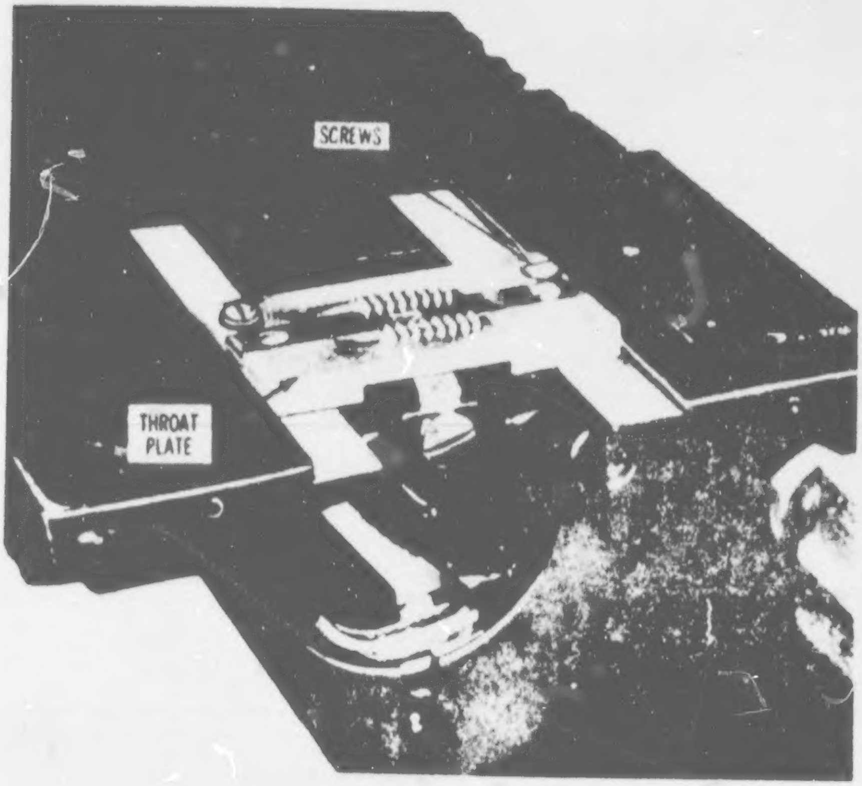

SCREWS
THROAT PLATE

Figure 76. Throat plate and screws.

865

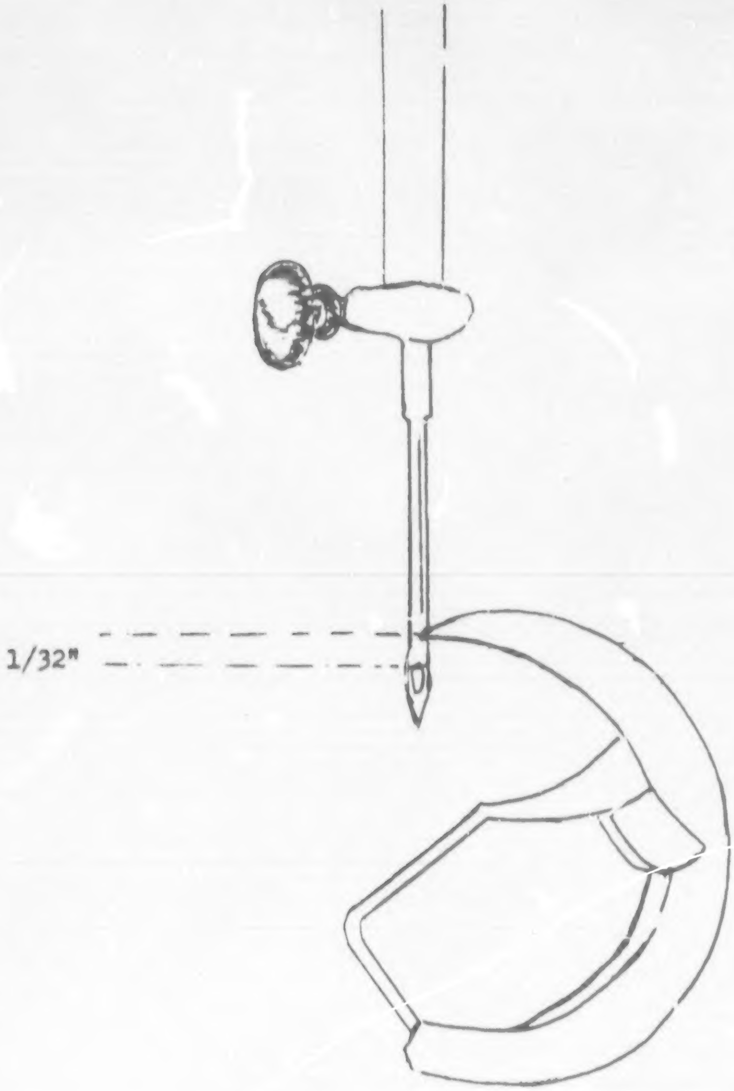
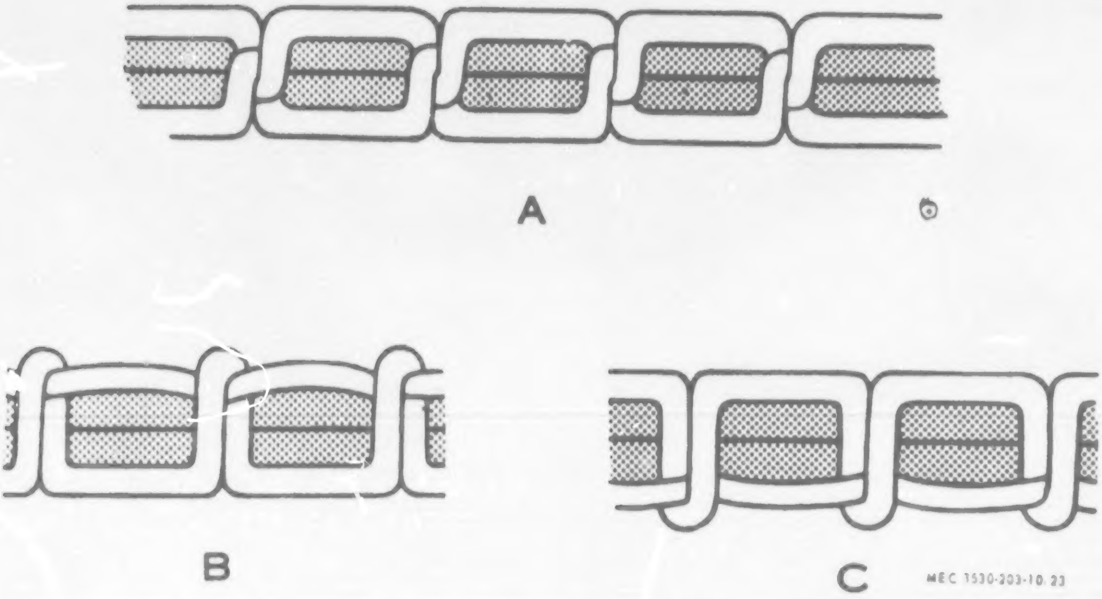


Figure 77. Timing the Needle with Shuttle Point.


A
B
C
MEC 3530-203-10.23

A--Correct stitch

B—Needle thread tension too strong C—Needle thread tension too weak

Figure 78. Effect of tension on stitch.

867

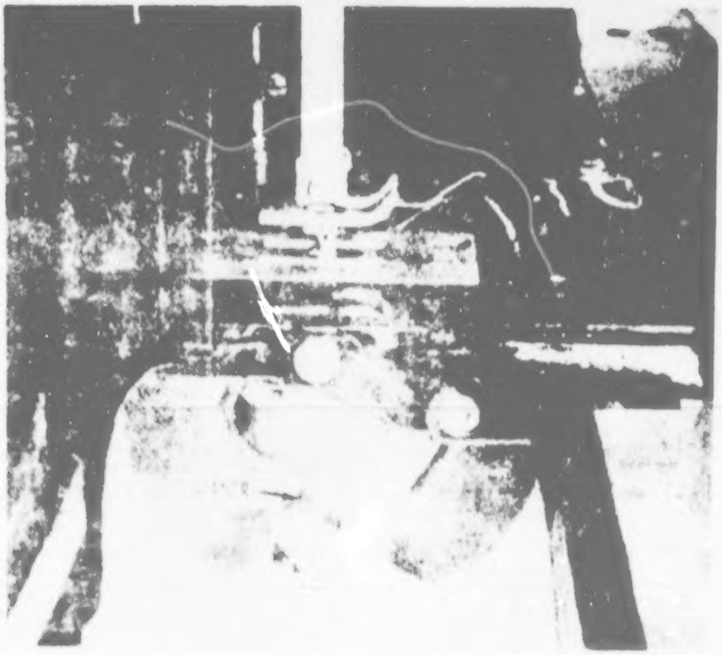


Figure 79. Removing bobbin with opener.

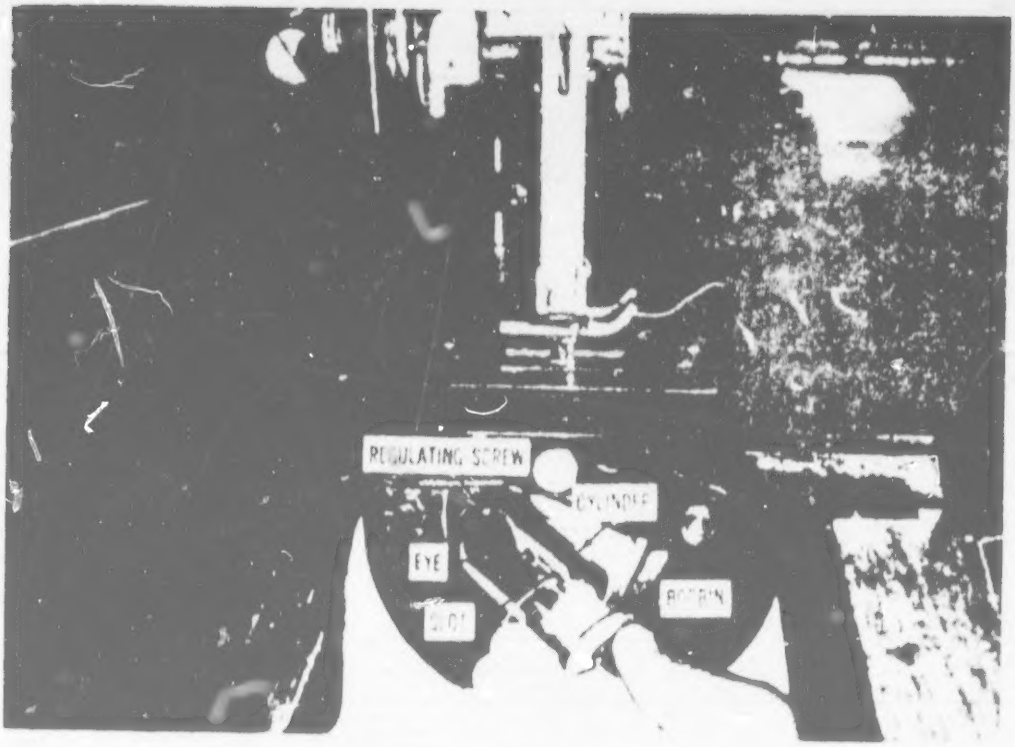

REGULATING SCREW
CYLINDER
EYE
SLOT
BOBBIN

Figure 80. Bobbin removed

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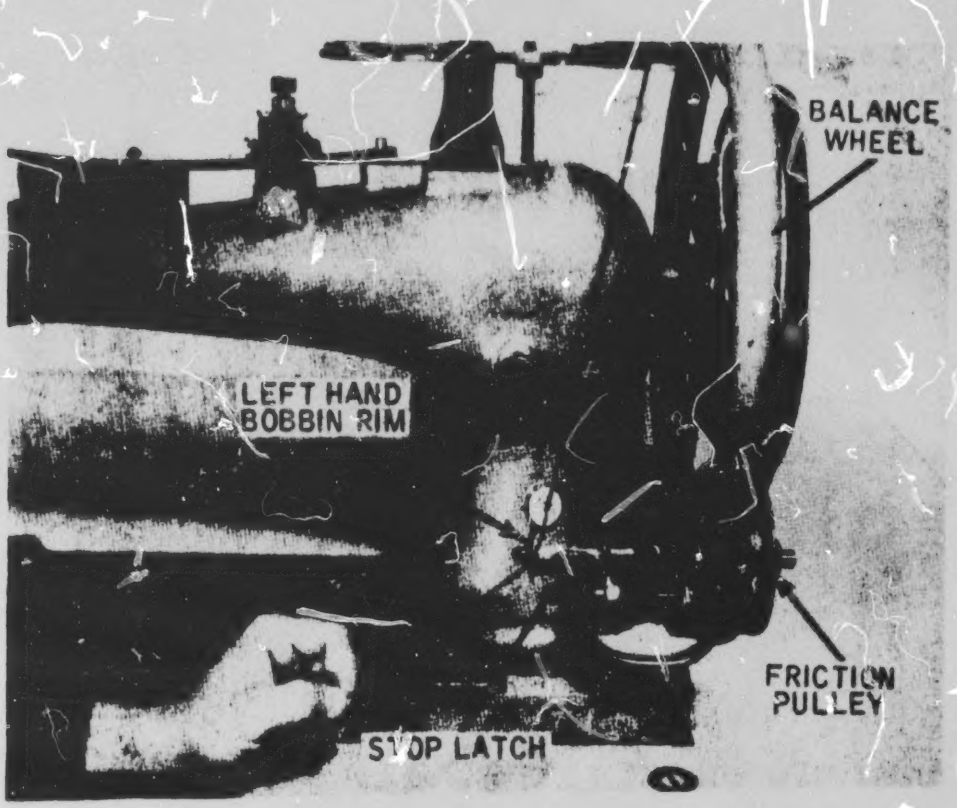
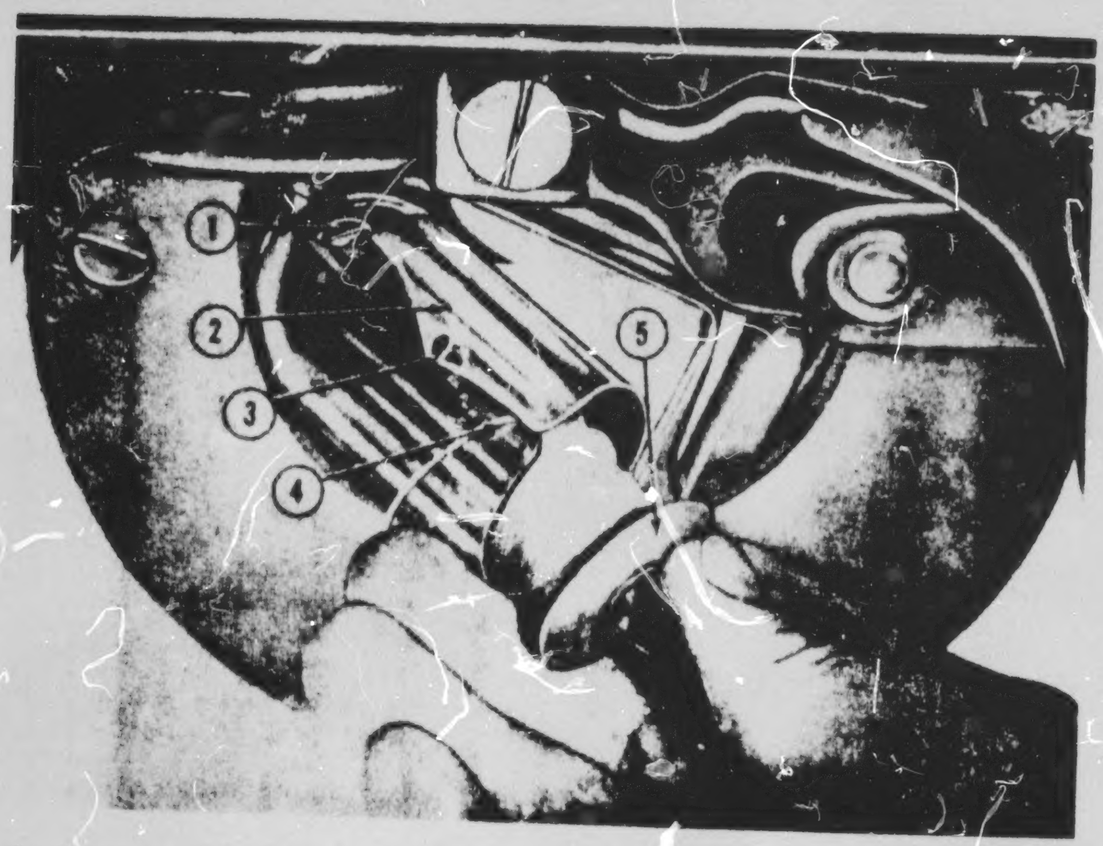

BALANCE WHEEL
LEFT HAND BOBBIN RIM
FRICTION PULLEY
STOP LATCH

Figure 81. Winding the bobbin.



① Shuttle tension regulating spring
② Shuttle tension spring
③ Bobbin thread delivery eye
④ Bobbin thread (in spring slot)
⑤ Bobbin

Figure 82. Replacing the bobbin.

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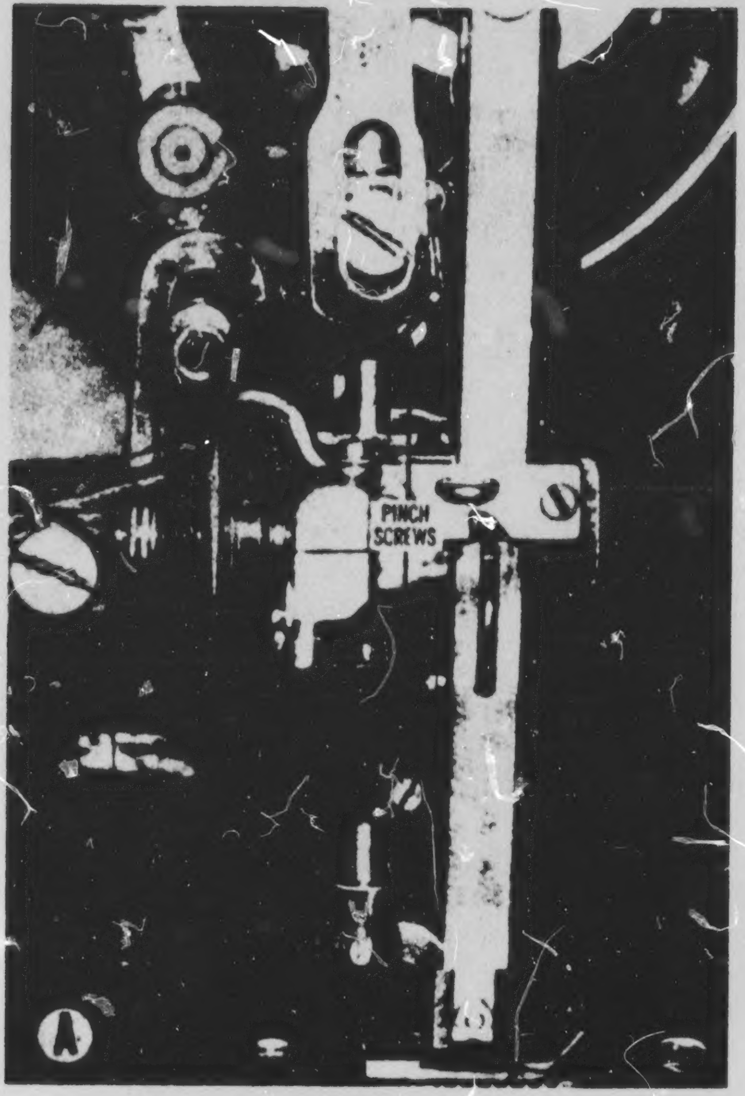
PINCH SCREWS
A

Figure 83. Adjusting presser feet.

A Two pinch screws

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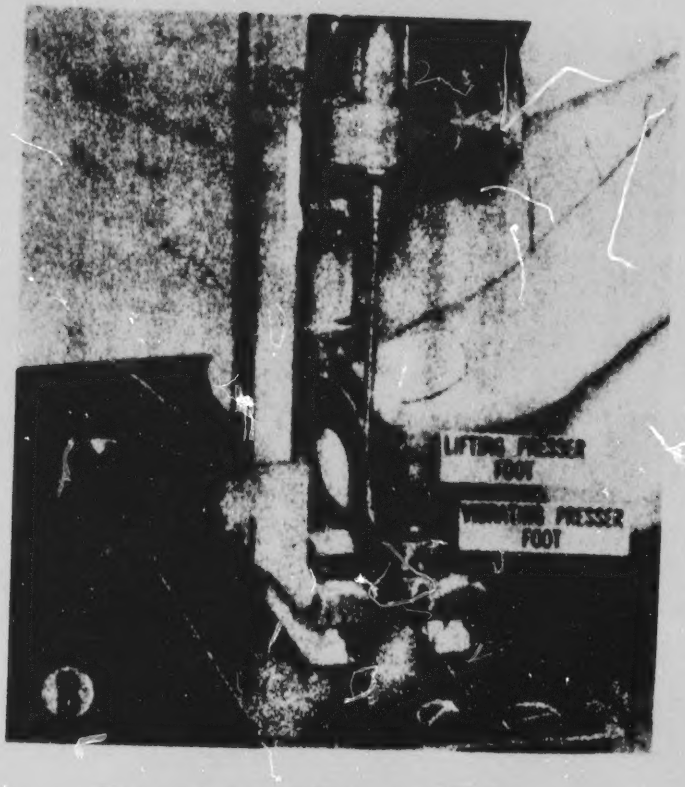
LIFTING PRESSER FOOT
VIBRATING PRESSER FOOT

Figure 83. (Continued)

B. Lifting presser foot on top of vibrating presser foot.

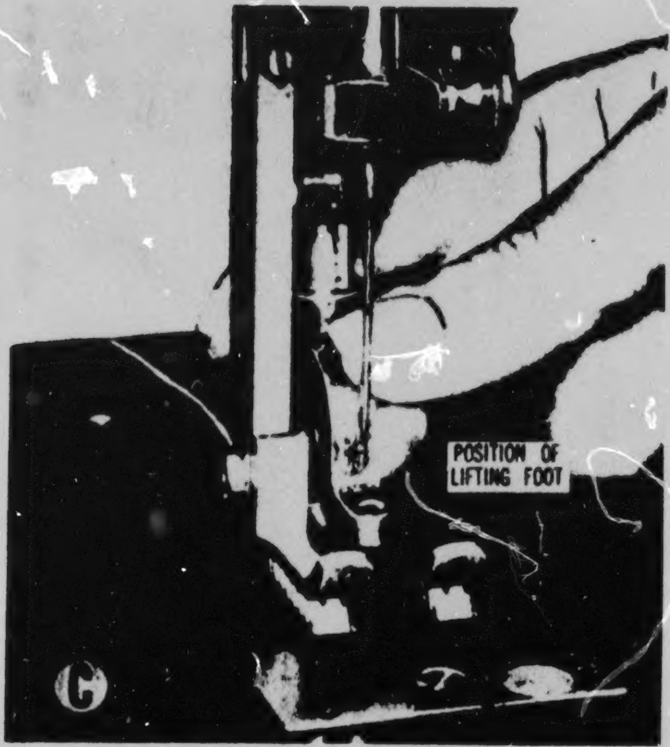
POSITION OF LIFTING FOOT
C

Figure 83. (Continued)

C Turning lifting presser foot

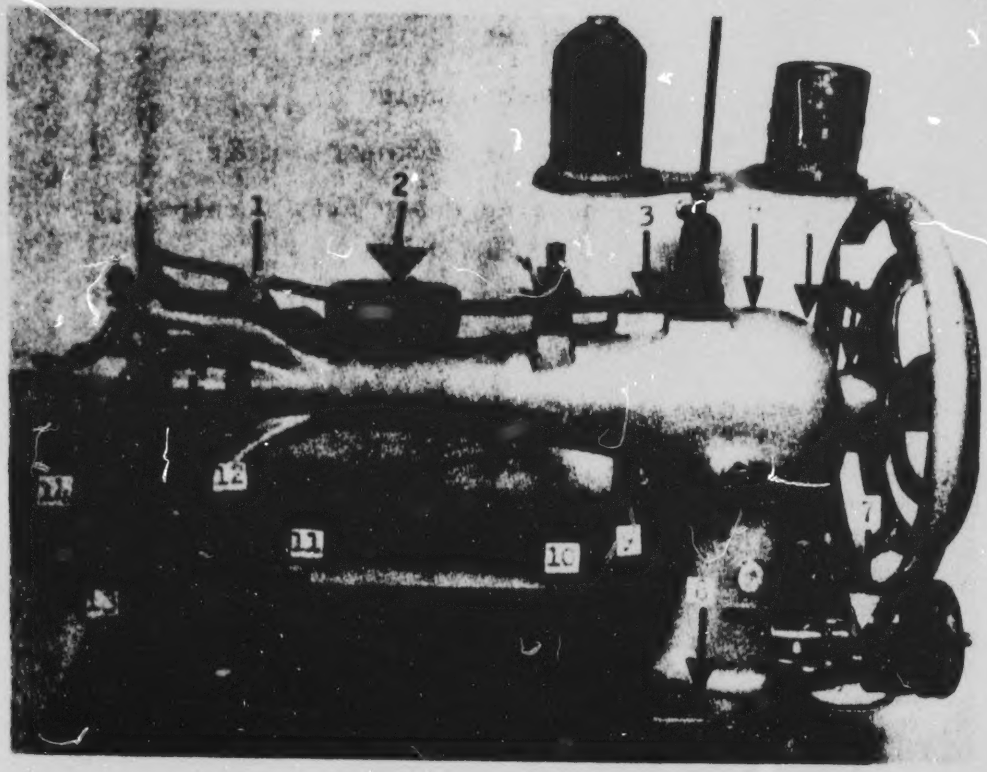
1
2
3
7
10
11
12

Figure 84. Lubrication points on arms and bed of the machine.

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QMS 244.18 L/PG

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-6 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Troubleshooting Heavy Duty Machine, Model 7-33

TYPE: Programed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT AND MATERIALS: Heavy duty sewing machine, Model 7-33; Tool kit; Thread; Needles; Salvage canvas material; QMS 244.18 L/PG (Student Learning and Performance Guide)

TRAINING AIDS: QMS 244.W1, Part I, Sec XVIII; Heavy duty sewing machine, Model 7-33

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 66, Para 87-98; TM 10-3530-203-24, Organizational and Maintenance Manual, Textile Repair Shop, June 66, Para 3 - 9; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Aug 72, Sec XVIII

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part I, Sec XVIII, Pgs 18.01 - 18.04.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

OCTOBER 1974

APPROVED BY C, CURR BR,
RTM DIV, [illegible]
JAN [illegible]

LESSON TITLE: Troubleshooting Heavy Duty Machine, Model 7-33

YOUR OBJECTIVE: As a result of this instruction, given this learning and performance guide, appropriate references, heavy duty sewing machine {model 7-33}, tool kit, thread, needles, and salvage canvas material, you will be able to detect and correct malfunctions on model heavy duty sewing machines in accordance with standards perscribed in TM 10-3530-203-10, Para 87-98; TM 10-3530-203-24, Para 3-9; and QMS 244.W1, Part I, Sec XVIII.

INTRODUCTION: Since the heavy duty machine is used to sew heavy weight material, it can very easily become out of adjustment. When your machine is not sewing properly, you, as the operator, will be expected to correct those stitching malfunctions within your realm of operator maintenance services. You will also be expected to correct malfunctions which cause needle or thread to break. To correct these malfunctions, you need to carefully consider the probable cause{s} and possible remedy{ies}. This process is known as troubleshooting.

DIRECTIONS:

1. Malfunctions have been intentionally created by your instructor. To correct these malfunctions you may need:

   a. Tool kit.

   b. Thread.

   c. Needles.

2. Turn to page 18.04 in QMS 244.W1, Part I. Read the 4 points under M carefully.

3. Inspect the machine to determine all malfunctions. Look up these malfunctions on the troubleshooting list {pages 18.01 - 18.04 }.

4. With power source off, correct malfunctions as directed on these pages. If necessary, refer to the following pages in your student workbook for review:

   a. Selecting needle and thread - pages 15.02 - 15.03.

   b. Installing the needle -- page 15.03.

   c. Removing, winding, and installing the bobbin --

pages 15.03 - 15.04 and figures 65-68 {pages 15.07 - 15.10}.

d. Threading the heavy duty sewing machine -- pages 15.04 - 15.06 and figure 69 {page 15.11}.

e. Setting needle eye with the shuttle point -- page 17.03 and figure 77 {page 17.09}.

f. Adjusting the presser foot pressure -- page 17.04 and figure 83 {pages 17.15 - 17.17}.

g. Tightening the shuttle race assembly -- page 16.04 {step 5} and the figure on page 16.12.

h. Adjusting tension on bobbin and needle thread -- pages 17.03 - 17.04 and figure 78 {page 17.10}. NOTE: Make a few stitches by turning the balance wheel by hand. This will insure that you do not have binding parts prior to turning on the power source.

5. Correct the malfunctions. DO NOT test run the machine until it has been checked by the instructor to insure that all adjustments have been made properly. If the machine is operated with a loose component, it could cause serious damage to the machine and/or injury to you the operator. When in doubt, do not hesitate to call on an instructor for assistance.

6. Test operate the machine only in the presence of an instructor. The instructor will determine if the machine operates at maximum efficiency or if it requires further adjustments.

7. The instructor will sign your student progression sheet when you have achieved your objective.

8. Having now completed all lessons on the heavy duty machine {model 7-33},you are to demonstrate your ability to prepare the machine for operation, perform maintenance, and make all operator's adjustments. You will be given an examination performance guide which is quite similar to your Learning and Performance Guides. Before asking for the examination guide, you may wish to review sections XV - XVIII in your student workbook.

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SECTION XVIII

TROUBLESHOOTING HEAVY DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. **Purpose and Scope.**

This section, by means of troubleshooting, will enable you to detect malfunctions in your machine and make corrections to those malfunctions within the operator's echelon; and spell out which malfunctions have to be reported as beyond the operator's echelon. The purpose of this period of instruction is to teach you the appropriate methods of detecting and correcting malfunctions of the heavy duty machine. This is called "Troubleshooting". To learn troubleshooting will make your assignment more effective, and most important by applying this knowledge when you get on the job, will keep a sewing machine off deadline for an indefinite period.

II. References.

TM 10-3530-203-10
TM 10-3530-203-24

III. Performance Standards.

In this section, a performance standard is the actual performance of correcting the malfunctions. Therefore, check your performance by referring to the corrections next to each malfunction listed to the left of the pages in para IV below.

IV. Troubleshooting Heavy Duty Sewing Machine.

A. Needle Thread Breaks.

1. Needle is too light for fabric - Change needle to correct size.

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2. Machine is incorrectly threaded - Rethread machine properly.

3. Thread tension is too tight - Adjust thread tension.

4. Thread is damp or defective - Replace with dry, smooth thread.

5. Needle is incorrectly installed - Install needle properly.

6. Needle is defective, bent, or blunt - Install serviceable one.

B. Needle Breaks.

1. Needle is loose in clamp. Tighten needle.

2. Needle is of wrong class, variety or size - Use correct needle.

3. Presser foot is loose - Tighten presser foot.

C. Bobbin Thread Breaks.

1. Thread is damp or defective - Use dry, smooth thread.

2. Bobbin tension is too great - Adjust bobbin tension.

3. Bobbin case is incorrectly threaded - Thread bobbin case correctly.

4. Bobbin case is wound unevenly, too loose, or too full to revolve freely - Reset bobbin winder to wind bobbin correctly and rewind bobbin.

D. Stitches Skip or Fail to Lock.

1. Needle is incorrectly installed - Install needle properly.

2. Needle bar is out of adjustment - Adjust needle bar and time needle with sewing hook point.

3. Shuttle race is loose - Tighten shuttle race assembly.

E. Stitches are Uneven or Pile Up.

1. Feed dog is too low - Report condition to supervisor.

2. Presser foot pressure is too weak - Adjust presser foot pressure.

F. Seams Draw.

1. Tension on thread too tight - Adjust tension.

2. Operator feeding material at improper speed - Don't hold back or push material. Feed at speed of machine.

G. Thread Balls Up Under Throat Plate.

Thread tension out of adjustment - Adjust thread tension.

H. Feed Dogs Strike Throat Plate.

Feed dogs are out of adjustment - Report this condition.

I. Lamp Does Not Light When Switch is in ON Position.

1. Incandescent lamp bulb is burned out - Remove the retaining ring, lens and reflector, old bulb, replace with serviceable bulb. Replace all components in place.

2. Lamp assembly is defective - Notify immediate supervisor.

3. Switch is defective - Notify immediate supervisor.

4. Power receptacle is defective - Notify immediate supervisor.

J. Motor Does Not Start When Switch is in ON Position.

Notify immediate supervisor.

K. Unusual Noise in Motor.

Motor is defective - Notify immediate supervisor.

L. Motor Does Not Pull Load.

1. Drive belt is slipping - Notify immediate supervisor.
2. Improper voltage - Notify immediate supervisor.
3. Motor is defective - Notify immediate supervisor.

M. Safety and Workmanship Precautions.

1. When you encounter a heavy duty machine with one of the several malfunctions, study the possible cause before plunging into correcting the cause with a "hit and miss" attitude.

2. Do not disassemble any component of the heavy duty machine unless absolutely necessary and within your echelon. If you find it necessary to disassemble any portion of the sewing machine make certain that you lay out the parts in sequence, this is a sign of good workmanship.

3. When making adjustments or replacing components of the heavy duty machine make certain that the power source is turned off, especially when working on power assemblies such as motor, lamp assemblies and motor switches.

4. When in doubt, don't take chances or make guesses. Here at the school we urge you to call on the instructor. When you get to your next assignment refer to the technical manuals (TM 10-3530-203-10 and TM 10-3530-203-24), or call your supervisor or section leader.

CW-C-7 882

U. S. ARMY QUARTERMASTER SCHOOL
PERFORMANCE EXAMINATION GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-7 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Heavy Duty Sewing Machine, Model 7-33, Examination

TYPE: Examination

TOOLS, EQUIPMENT AND MATERIALS: Heavy duty sewing machine, Thread, Needles, Tool Kit, Salvage Canvas, Solvent compound, Sash brush, Cleaning materials, Lubricants, Rags, and Needle and Thread Chart.

TRAINING AID: Heavy Duty Sewing Machine, Model 7-33

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Para's 29-31, 51-56, & 87-98; TM 10-3530-203-24, Organizational and Maintnenace Manual, Textile Repair Shop, June 1966, Para 3-77; QMS 244.W1, Part I, Canvas and Webbed Equipage Repair Course, Aug 1972, Sections XIV-XV & XVII-XVIII.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

NOVEMBER 1974

EXAMINATION TITLE: Heavy Duty Sewing Machine, Model 7-33, Examination

YOUR OBJECTIVE: Given tool kit, heavy duty sewing machine, thread, needles, salvage canvas, solvent compound, sash brush, lubricants, needle and thread chart, and appropriate references, you are to be able to demonstrate ability to prepare machine for operation, perform maintenance, and make all operator's adjustments; examination covers material in blocks C-2, C-3, C-5, and C-6 in accordance with standards prescribed in TM 10-3530-203-10, Para's 29-31, 51-56, & 87-98; TM 10-3530-203-24, Para 3-77; and QMS 244.W1, Part I, Sections XIV-XV and XVII-XVIII.

INTRODUCTION: This examination is a performance examination designed to measure your ability to thread and make adjustments on the heavy duty sewing machine (Model 7-33). You will be graded on your performance -- on how well you accomplish your tasks. Since this is a performance examination designed to measure your ability to perform job related tasks and not your ability to memorize, you may use all appropriate references that have been issued to you. You will be allowed sufficient time to complete the examination. Be sure to follow the standards taught in previous hours on this machine.

DIRECTIONS:

1. Prior to starting your examination, your instructor will unthread the needle and bobbin thread on your machine.

2. You will need the following tools and materials to accomplish your examination objective:

   a. Heavy duty sewing machine (Model 7-33).

   b. Tool kit.

   c. Thread.

   d. Needle and Thread Chart.

   e. Canvas material.

   f. Solvent compound.

   g. Sash brush.

   h. Lubricants.

i. Rags.

j. DA Form 2404, attached to the machine.
k. Appropriate references.

3. Remember to observe all safety precautions and to use your tools and equipment in a manner which will prevent accidents.

4. You are to perform the following tasks:

    a. Thread with needle and bobbin thread.

    b. Install the bobbin correctly.

    c. Adjust and time the needle bar.

    d. Adjust the presser foot.

    e. Adjust the thread unwinder tension.

    f. Adjust the stitch regulator.

    g. Adjust the bobbin tension.

    h. Remove and install the needle.

    i. Lubricate the machine.

    j. Clean the machine.

    k. Fill out DA Form 2404.

(NOTE: WHILE YOUR INSTRUCTOR MAY NOT HELP YOU PERFORM THESE EXAMINATION TASKS, IF YOU HAVE ANY QUESTIONS ABOUT WHAT YOU ARE EXPECTED TO DO, RAISE YOUR HAND.)

5. After you have finished all your tasks, your instructor will check and evaluate your work. The instructor will point out your errors and demonstrate corrective procedures.

6. Test operate the machine and leave a test patch in the machine to indicate the machine is functioning properly. Turn off the switch. Place the cover over the machine and police up the immediate work area.

7. Your instructor will now sign your progression sheet and assign your next lesson.

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FR-I-7-E2

U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
HEAVY DUTY SEWING MACHINE, MODEL 7-33, EXAMINATION FR-I-7

STUDENTS' EXAMINATION OBJECTIVE: To demonstrate ability to prepare machine for operation, perform maintenance, and make all operator's adjustments.

DIRECTIONS:

1. Materials Required:
   - a. Learning Performance Guide (FR-I-7 PE1-1).
   - b. Deviation Sheet (FR-I-7-E2).
   - c. Exam Record Sheet (TRADOC Form 533-R).
   - d. Heavy Duty Sewing Machine (Model 7-33).
   - e. Tool Kit.
   - f. Thread.
   - g. Needle and Thread Chart.
   - h. Canvas Material.
   - i. Solvent Compound.
   - j. Sash Brush.
   - k. Lubricants.
   - l. Rags.
   - m. DA Form 2404 attached to the machine.
2. Examination Tasks:
   - a. Thread with needle and bobbin thread.
   - b. Install the bobbin correctly.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES
AUGUST 1976
THIS GRADE SHEET SUPERSEDES CW-C-7 GS DATED DECEMBER 1974

c. Adjust and time the needle bar.

d. Adjust the presser foot.

e. Adjust the thread unwinder tension.

f. Adjust the stitch regulator.

g. Adjust the bobbin tension.

h. Remove and install the needle.

i. Lubricate the machine.

j. Clean where necessary.

k. Fill out DA Form 2404.

3. Scoring Procedures:

a. Use Deviation Rating Sheet (FR-I-7-E2) to determine the student's performance on each item.

b. Enter each student's name at the top of each column.

c. Under each student's name record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score (columns 34-38), locate the raw score (student's total points) on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (FR-I-7-E2). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting. File grade sheet in class record file.

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FR-I-7-E2

U. S. ARMY QUARTERMASTER SCHOOL
GRADING SHEET

PERFORMANCE EXAMINATION

FABRIC REPAIR COURSE

GRADE SHEET

HEAVY DUTY SEWING MACHINE (Model 7-33)

Maximum Possible Score 66 Minimum Passing Score 46	VALUE	NAME OF STUDENT						
A. THREADING								
1. Threading Needle Thread	14							
2. Needle threaded properly	2							
3. Bobbin wound properly	5							
4. Bobbin installed properly	5							
B. ADJUSTMENTS								
1. Needle Bar adjusted properly	5							
2. Presser foot adjusted properly	2							
3. Thread unwinder tension correct	2							
4. Stitch length adjusted properly (5 to 7 per inch)	5							
5. Bobbin thread tension correct	5							
6. Needle installed correctly	5							
C. MAINTENANCE								
1. Lubrication	5							
2. Overall cleanliness	3							
3. DA Form 2404 filled out	3							
D. GENERAL								
1. Care of tools and equipment	2							
2. Students regard for safety	3							
TOTAL	66							

U. S. ARMY QUARTERMASTER SCHOOL

Deviation Rating Sheet
for
HEAVY DUTY SEWING MACHINE, MODEL 7-33, EXAMINATION

This deviation rating sheet is used to rate the student's performance on the Heavy Duty Sewing Machine, Model 7-33, Examination (CW-C-7) and will be used in conjunction with the grade sheet (CW-C-7 GS).

Refer to the grade sheet for scoring procedures.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

DECEMBER 1974

U.S. ARMY QUARTERMASTER SCHOOL
DEVIATION SHEET

CW-C-7 DS

PERFORMANCE EXAMINATION

CANVAS AND WEBBED EQUIPAGE REPAIR COURSE

DEVIATION SHEET

HEAVY DUTY SEWING MACHINE (Model 7-33)

Maximum Possible Score 66 Minimum Passing Score 46	VALUE	ANY DEVIATION	MINUS 1 UP TO 4	MINUS 2/ PLUS 2	TOO TIGHT/TOO LOOSE/TOO FULL	TOO HIGH(1/8") TOO LOW(1/8")	TOO HIGH(1/16") TOO LOW(1/16")	ANY GREATER DEVIATION
A. THREADING								
1. Threading Needle Thread	14		1-4					14
2. Needle threaded properly	2	2						
3. Bobbin wound properly	5				3			5
4. Bobbin installed properly	5		1-4					5
B. ADJUSTMENTS								
1. Needle Bar adjusted properly	5					3	2	5
2. Presser foot adjusted properly	2	2						
3. Thread unwinder tension correct	2	2						
4. Stitch length adjusted properly (5 to 7 per inch)	5			3				5
5. Bobbin thread tension correct	5				3			5
6. Needle Installed correctly	5	5						
C. MAINTENANCE								
1. Lubrication	5	5						
2. Overall cleanliness	3	3						
3. DA Form 2404 filled out	3	3						
D. GENERAL								
1. Care of tools and equipment	2	2						
2. Students regard for safety	3	3						

CW-C-7 DS 890

RAW SCORE CONVERSION SHEET

RAW SCORE	PERCENT	RAW SCORE	PERCENT
66	10000	44	06667
65	09849	43	06515
64	09697	42	06364
63	09546	41	06212
62	09394	40	06061
61	09242	39	05909
60	09091	38	05758
59	08939	37	05606
58	08788	36	05455
57	08636	35	05303
56	08485	34	05152
55	08333	33	05000
54	08182	32	04849
53	08030	31	04697
52	07879	30	04546
51	07727	29	04394
50	07576	28	04242
49	07424	27	04091
48	07273	26	03939
47	07121	25	03788
46	06970	24	03636
45	06818		

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QMS 244.20 L/PG

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-8 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Preparation of Medium Duty Sewing Machine for Operation

TYPE: Programmed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT AND MATERIALS: Medium Duty Sewing Machines. Appropriate references, Thread, Needles, Needle and Thread Chart, Took kit, Cleaning Materials, Lubricants, Sash Brush, and Rags

TRAINING AIDS: QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Aug 1972, Section XX, Pgs 20.01-20.07

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, April 1966, Para 35; and QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Section XX

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part I, Section XX, Pgs 20.01-20.07

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1975

LESSON TITLE: Preparation of Medium Duty Sewing Machine for Operation.

YOUR OBJECTIVE: As a result of this instruction, given appropriate references, medium duty sewing machine, thread, needles, tool kit, needle and thread chart, cleaning materials, lubricants, and QMS 244.20 Student Learning and Performance Guide, you will be able to prepare model medium duty sewing machine for operation in accordance with standards prescribed in TM 10-3530-203-10, Para 35 and QMS 244.W1 Student Workbook, Part I, Section XX.

INTRODUCTION: Because this machine runs at very high speed, the procedures for preparing this machine for operation must be followed accurately and with precision. Some machines may operate with a threading point incorrectly made, not this machine. This machine must be clean and well-lubricated, as well as adjusted correctly, if you expect it to perform and sew without malfunctioning.

DIRECTIONS:

1. For this lesson, you will be performing as directed in QMS 244.W1, Section XX, Pgs 20.01-20.07. You will need the following items;

   a. Medium duty sewing machine.

   b. Thread.

   c. Needle.

   d. Thread and needle chart.

   e. Tool kit.

   f. Cleaning materials.

   g. Lubricants.

   h. Sash brush.

   i. Rags.

   j. QMS 244.W1, Pt I.

2. **SAFETY PRECAUTION:** Disconnect power cords or turn off the power switch before beginning maintenance operation.

3. Read the performance standards on pages 20.01-20.02. NOTE: Your instructor will use these same standards to evaluate your work.

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4. Prepare the machine for operation by following the sequence in QMS 244.W1, Part I, Pgs 20.02 - 20.07;

   a. Remove and install the needle.

   b. Remove the bobbin.

   c. Wind the bobbin.

   d. Install the bobbin.

   e. Thread with needle thread.

   f. Catch the bobbin thread.

5. If you have problems at any time, raise your hand and an instructor will give you assistance.

6. Have the instructor sign your progression sheet. He will then direct you to the next block of instruction.

SECTION XX

PREPARATION FOR OPERATION, MEDIUM DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope.

With the instructions in this section, you will be able to prepare the machine for operation by removing the bobbin from the machine, threading the bobbin winder according to thread chart, winding a bobbin, threading the bobbin case by correctly placing bobbin in case, installing needle in needle bar with groove of needle to operators left, and threading machine according to threading chart.

II. Reference.

TM 10-3530-203-10

III. Performance Standards. Use these standards to check the accuracy of your work.

A. Make sure all threading points are covered and threaded correctly.

B. Make sure bobbin is threaded correctly in case and thread pulling from left of bobbin.

C. Make sure latch is pressed down over bobbin.

D. Thread should be completely under tension spring of bobbin case.

E. Make sure safety precautions are followed, especially turning off motor switch when threading or installing needle, or anytime machine is not actually being operated.

F. Proper amount of thread (3 inches) back under presser feet before starting to sew.

G. Bobbin not wound too full nor too loose, nor too tight.

H. Presser feet raised when winding bobbin.

I. Needle eye threaded correctly from left to right; also long groove of needle to operator's left.

IV. Preparing Machine for Operation.

NOTE: Make sure motor switch is off before handling the machine.

A. Removing and Installing the Needle.

1. Place needle bar to highest point. (Turn balance wheel towards operator).

2. Loosen the needle setscrew.

3. Remove needle from bar.

4. Install new needle. (The long groove must be to the operator's left. Use a good needle, never a bent one or one with a dull or a blunt point. The correct class and variety needle for this machine is 135 x 17. The size most commonly used is 22).

5. Tighten the setscrew securely.

B. Removing the Bobbin. (Fig 89)

1. Open slide plate (pull plate to operator's right).

2. Lift bobbin case latch (insert finger tip under the latch).

3. Lift the bobbin from the machine.

C. Winding the Bobbin. (Fig 90)

1. Place the bobbin on the bobbin winder spindle and push it on as far as it will go.

2. Pass the thread from the bobbin thread cone on the thread unwinder down through the thread hole in the tension bracket and down between the bobbin winder tension disks.

3. Pull the thread from the lower side of the tension disks to the bobbin.

4. Pass the thread around the bottom side of the bobbin, wind the end of the thread around the bobbin a few times.

5. Push the bobbin winder pulley over against the machine belt by pressing on the top latch thumb lever until the automatic stop latch catches and holds the pulley against the driving belt.

6. Turn motor switch on and lift the presser foot.

7. Depress the treadle to connect the motor with the machine. Operate the machine until the bobbin is full. If the bobbin winder is properly adjusted, the automatic stop latch will operate and throw the bobbin winder pulley away from the machine belt when the bobbin is full.

8. Remove bobbin from bobbin winder spindle.

9. Turn off motor switch.

NOTE: The bobbin may be wound while the machine is in operation. However, if no material is under the needle, pull the needle thread out of the eye of the needle. Pull the needle thread from the needle to prevent it from catching the bobbin thread and balling up under the throat plate. Raise the presser foot to prevent undue wear upon the feed dog.

D. **Installing the Bobbin.**

1. Hold the bobbin so that the thread pulls counterclockwise.

2. Slip the bobbin over the latch and center stud and push down the latch.

3. Draw the thread into the slot between the bobbin case opener and the triangular projection on the bobbin case.

4. Pull about 6 inches of the bobbin thread above the throat plate.

5. Close the slide plate, but leave space between the slide and the throat plates large enough for the thread to slip through when it is caught by the needle thread.

E. **Threading the Needle Thread.** (Fig 91)

1. With the needle at the highest point (position), pass the thread from the thread unwinder through the hole in the thread guide, which is mounted on the machine arm cover.

2. Pass the thread through the three holes of the thread tension guide, start at the top hole and thread from right to left, from left to right through the middle hole, and from right to left through the bottom hole.

3. Pass the thread over and between the tension disc from right to left.

4. Wind the thread around the thread controller from right to left.

5. Place the thread under the controller spring and the controller projection so that the controller spring holds the thread down.

6. Pull the thread through the thread guide, and then from right to left through the eye of the take-up lever.

7. From the eye of the take-up lever, pass the running end of the thread back again down through the thread guide.

8. Lead the thread behind the oil felt pad.

9. Draw the thread through the thread guide.

10. And last from left to right through the eye of needle.

NOTE: See Figure 91 for completed view on threading the medium duty sewing machine.

F. Catching the Bobbin Thread.

1. Raise the presser bar lifter to lock the presser foot in its raised position.

2. With the left hand hold the end of the needle thread with a little slack and towards the upright arm of the machine.

3. With the right hand turn the balance wheel toward the operator until the needle moves from its highest position, down, and back up to its highest position. If the needle thread is held with a light tension during this operation, and if the needle is correctly timed, the needle thread will catch the bobbin thread.

4. Pull the needle thread up, drawing the bobbin thread up through the hole in the throat plate. Lay both threads back under and behind the presser foot. (Both threads should be about 3 inches long behind the presser foot).

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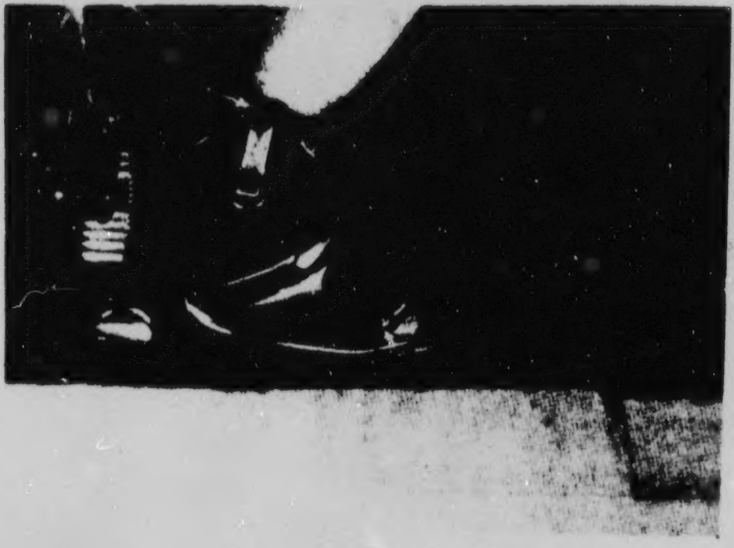

Figure 89. Removing the Bobbin.

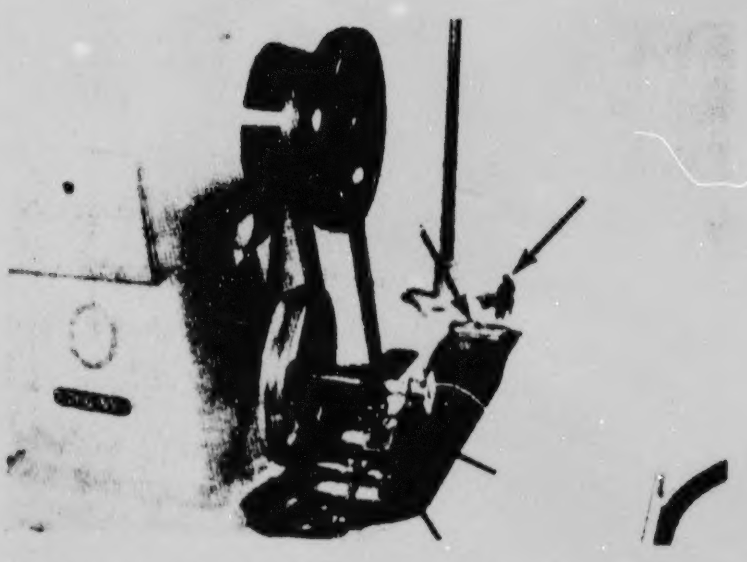

Figure 90. Winding the Bobbin.

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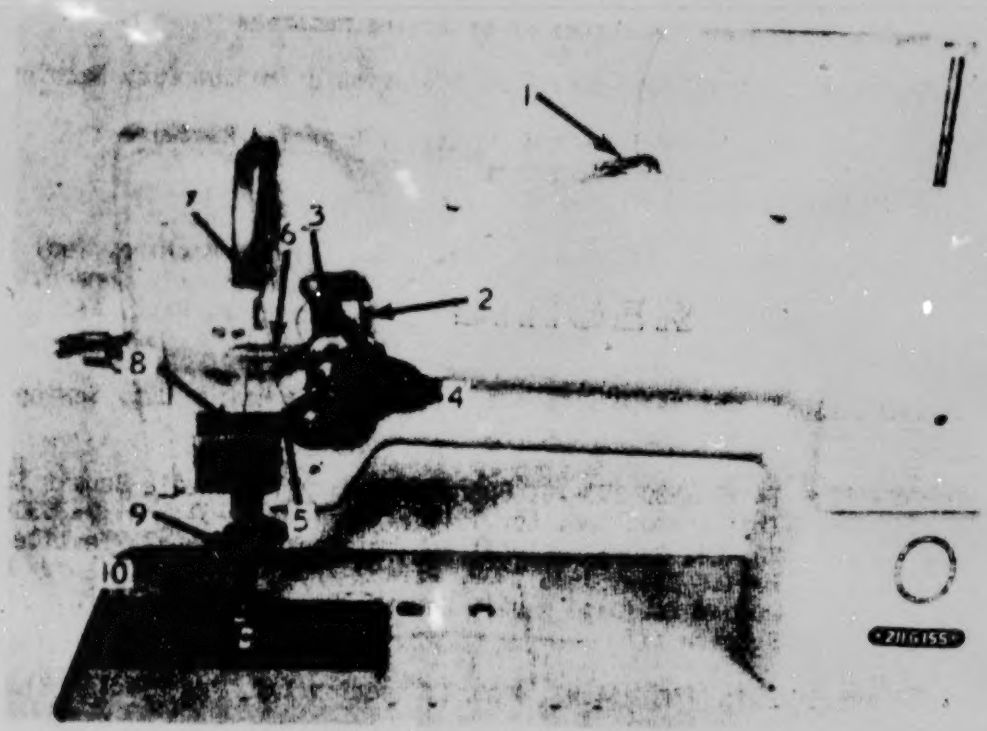
1
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211G155

Figure 91. Threading points (Medium Duty Sewing Machine.)

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U. S. ARMY QUARTERMASTER SCHOOL

LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-9 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Adjustment and Operation of Medium Duty Machine

TYPE: Programed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Medium Duty Sewing Machine, Tool Kit, Salvage Canvas Material, Thread, Needles, Lubricants, Rags, and QMS 244.21 L/PG.

TRAINING AIDS: QMS 244.W1, Part I, Section XXI, Medium Duty Sewing Machine

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Para 29-30-31; TM 10-3530-203-24, Organizational and Maintenance Manual, Textile Repair Shop, June 1966, Para 3-77; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section XXI

STUDY ASSIGNMENT: QMS 244.W1, Part I, Section XXI, Pgs 21.01 - 21.09

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: Petroleum and Field Services

NOVEMBER 1974

LESSON TITLE: Adjustment and Operation of Medium Duty Machine

YOUR OBJECTIVE: As a result of this instruction, given medium duty sewing machine, tool kit, salvage canvas material, thread, needles, lubricants, rags, appropriate references, and QMS 244.21 L/PG (Student Learning and Performance Guide), you will be able to operate and adjust model medium duty sewing machine in accordance with standards prescribed in TM 10-3530-203-10, para 29-30; TM 10-3530-203-24, para 3-77; and QMS 244.W1, Part I, Section XXI.

INTRODUCTION: Since the medium duty machine is faster than the other five machines which you will operate within your MOS, it jumps out of time easier. Since the machine's parts are more complex, it breaks down more often. If the shuttle hangs up on thread or material, it will throw out the automatic safety clutch. If a particle of dirt gets under the bobbin, the thread may break. As a machine operator, you will be expected to deal with these and other malfunctions which come under the category of operator maintenance. In order to prevent the medium duty machine from being put on deadline (inoperable) status, you will need to learn to adjust these common machine malfunctions.

DIRECTIONS:

1. For this lesson you will be performing as directed in QMS 244.W1, Part I, Section XXI, Pages 21.01 - 21.10. You will need the following items:

   a. Medium duty sewing machine.

   b. Tool kit.

   c. Cleaning solvent.

   d. Salvage canvas material.

   e. Needles.

   f. Lubricants.

   g. Rags.

   h. This Student Learning and Performance Guide.

2. FOLLOW SAFETY PRECAUTIONS: DISCONNECT POWER CORDS OR TURN OFF THE POWER SOURCE BEFORE BEGINNING MAINTENANCE OPERATIONS.

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3. First read the performance standards on page 21.02, para V. (NOTE: Your instructor will use these same standards to evaluate your work.)

4. Perform the following adjustments as directed in pages 21.01 - 21.10:

   a. Adjust the motor clutch pedal.

   b. Time the needle bar with the sewing hook.

   c. Operate the medium duty machine.

   d. Stop the medium duty sewing machine.

   e. Read safety precautions.

   f. Adjusting needle thread tension.

   g. Adjusting the bobbin tension.

   h. Adjusting the pressure on the material (lifting presser foot).

   i. Adjusting pressure on vibrating presser foot.

   j. Winding the bobbin while sewing.

   k. Preventive maintenance service.

   l. Reengagement of the safety clutch.

4. Have the instructor check and evaluate your work and sign your progression chart. He will then assign you to your next lesson.

SECTION XXI

ADJUSTMENT AND OPERATION OF MEDIUM DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. Purpose and Scope.

The instructions in this section will enable you to adjust the motor clutch pedal to achieve the correct starting and braking action of machine; time the needle bar with the sewing hook according to timing measurements without deviation; insert material of various thicknesses (one thickness at a time); stitch and make adjustments to presser foot in accordance to the thickness of material inserted; adjust bobbin and needle threads in accordance with tension chart; wind the bobbin while sewing; make any necessary adjustments to the bobbin winder and bobbin winder tension; observe all safety precautions in operating and making adjustments; perform "during operation" preventive maintenance services in accordance with lubrication charts and operator's PM check list; remove work from machine to the satisfaction of the instructor; and perform "after operation" preventive maintenance services according to operator's PM check list and the references for this lesson.

II. Review.

There are very few similarities between this machine and the heavy duty machine. This machine runs much faster than the heavy duty model and the parts are somewhat smaller and more complex than the heavy duty machine. Adjustments are of closer tolerance than the heavy duty machine and you must be more careful regarding safety with this machine.

III. Reference.

TM 10-3530-203-10

IV. Tools and Supplies Required.

Screwdrivers
Cresent wrench
Lubricating oil
Wiping rags
Sewing material

V. Performance Standards. Use these standards to check the accuracy of your work.

A. Adjust motor clutch pedal so it will not touch the floor and when released, will disengage the clutch.

B. Needle bar is adjusted so the hook is 1/16" above the needle eye when the needle bar raises 3/32 of an inch from its lowest position.

C. When making adjustments, keep motor switch OFF.

D. Thread tension should be adjusted so lock of thread is in middle of material sewn.

E. Operator's "PM" services are performed.

F. Presser feet adjusted so material does not bind when being sewn.

VI. Adjustment and Operation of Medium Duty Sewing Machine.

A. Adjusting Motor Clutch Pedal. The pedal is located at the bottom of the stand. It is used to operate or to engage the clutch. Press it downward to engage the clutch and to start the machine. Release the pedal to disengage the clutch.

1. Loosen the pitman rod clamp. Hold the pitman rod so it will not slip.

2. Lower or raise the top part of the pedal until it is about one inch from the floor.

3. Tighten the pitman rod clamp, do not overtighten the clamp as it is easily broken.

B. Timing the Needle Bar with the Sewing Hook. The sewing hook point must pass 1/16 of an inch above the top of the needle eye.

1. Remove the drive belt from balance wheel. Tilt machine to the rear to remove belt, then set machine upright.

2. Remove face plate thumb screw and plate.

3. Remove the throat plate screws and plate.

4. Turn balance wheel toward operator until the point of the sewing hook is centered with needle and needle bar has raised 3/32 of an inch from lowest position. The point of the sewing hook must be 1/16" above the top of the needle eye at this time.

5. Loosen the needle bar connecting stud pinch screw and lower or raise the needle bar until the top of the needle eye is about 1/16" below the sewing hook point. Making sure that the needle bar does not move, retighten the connecting stud pinch screw. On this adjustment there are no deviations.

6. Replace the throat plate and screws. The beveled end of throat plate is inserted away from operation. Square finger of bobbin case is inserted in bobbin case finger guide of throat plate.

C. Operation of Medium Duty Sewing Machine.

1. Inserting material in machine, turn balance wheel until needle bar moves up to its highest position. Raise the presser foot, place material under presser foot, then lower presser foot. Turn balance wheel until needle is in the material.

2. Turn motor switch to the ON position.

3. Sewing material. Hand-turn the balance wheel toward the operator and simultaneously hold the needle and bobbin thread until a few stitches are made. Then, removing your hand from balance wheel, press the treadle slowly to engage the clutch with the motor. Do not push or pull the material or you may bend the needle.

D. Stopping the Medium Duty Sewing Machine. Release the treadle to stop the machine. Hand-turn the balance wheel until the stitch is completed and the thread take-up lever is at its highest point and lift the presser bar lifter to raise the presser foot. Draw the material straight behind the presser foot, and cut needle and bobbin thread so that about 3 inches will be under and behind the presser foot.

E. Safety Precautions.

1. When making adjustments, keep motor switch in the "OFF" position.

2. When sewing, keep hands away from the needle.

3. Never sew at top speed. You do not have proper control over the machine and you may injure yourself as well as doing a poor job of sewing.

4. Remove drive belt when making adjustments to the sewing machine.

F. Adjusting Needle Thread Tension. (Fig 94) When the medium duty sewing machine is operating correctly, the lock of the stitch will be in the center of the material. To check and adjust, use the following procedures.

1. Test sew on the machine two or three inches, check top and bottom of the material to see if the lock of the stitch is in the center of the material.

2. Turn the tension regulator thumbnut to the right to increase or to the left to decrease the tension on the needle thread. If you can see the lock of the stitch on the bottom of the material, tighten the thumbnut. If the lock of the stitch is on the top of the material, loosen the thumbnut. The lock of the stitch is the crossing of the two threads, this lock must be in the center of the material.

NOTE: Adjust the needle thread tension only when the lifting presser foot is down.

G. Adjusting the Bobbin Tension. (Fig 94A)

1. Test sew on a piece of material two or three inches, check top and bottom of material to see if the lock of the stitch is in the center of the material.

2. Turn bobbin case tension screw, the bobbin case tension screw is turned to the right to increase the tension and to the left to decrease the tension, on the bobbin thread.

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NOTE: Adjust the bobbin case tension only when you cannot make the correction with the needle thread tension regulator thumbnut.

H. Adjusting Pressure on Material (Lifting Presser Foot).

1. The pressure should be just enough to hold the material firmly against the feed dog while the vibrating presser foot moves forward.

2. Adjust the pressure of the lifting presser foot on material with the regulating thumbscrew.

a. Turn the thumbscrew to the right to increase the pressure.

b. Turn the thumbscrew to the left to decrease the pressure.

I. Adjusting Pressure on Vibrating Presser Foot. Adjust the pressure of the front or vibrating presser foot with the thumbscrew on top of the machine face.

1. Turn the thumbscrew to the right to increase the pressure.

2. Turn the thumbscrew to the left to decrease the pressure.

J. Winding the Bobbin while Sewing. The bobbin may be wound while the machine is in operation. However, if the bobbin is rewound while sewing, the same procedures will be followed as rewinding the bobbin without sewing with material in the previous hours of instruction, except removing the thread from the needle.

K. Preventive Maintenance Service. The preventive maintenance services on the medium duty sewing machine is the same as the other machines except for placing two or three drops of oil on the green felt on the sewing hook assembly every time the bobbin is replaced and filling the oil reservoirs.

L. Re-engagement of the Safety Clutch.

1. A safety clutch, to prevent any damage by overload and damage to the hook, is installed in the lowest belt pulley.

2. The safety clutch will become disengaged and stop the hook from turning if any material or thread clogs the hook.

3. Before making this adjustment, be sure the hook is clear of thread and is not binding.

4. Open the bed on the right side of the needle to check.

5. Push or press the stitch length regulator button down and at the same time, turning the machine pulley, the hook driving shaft is locked until the safety clutch is re-engaged.

6. Reset the stitch length and the machine is ready for sewing.

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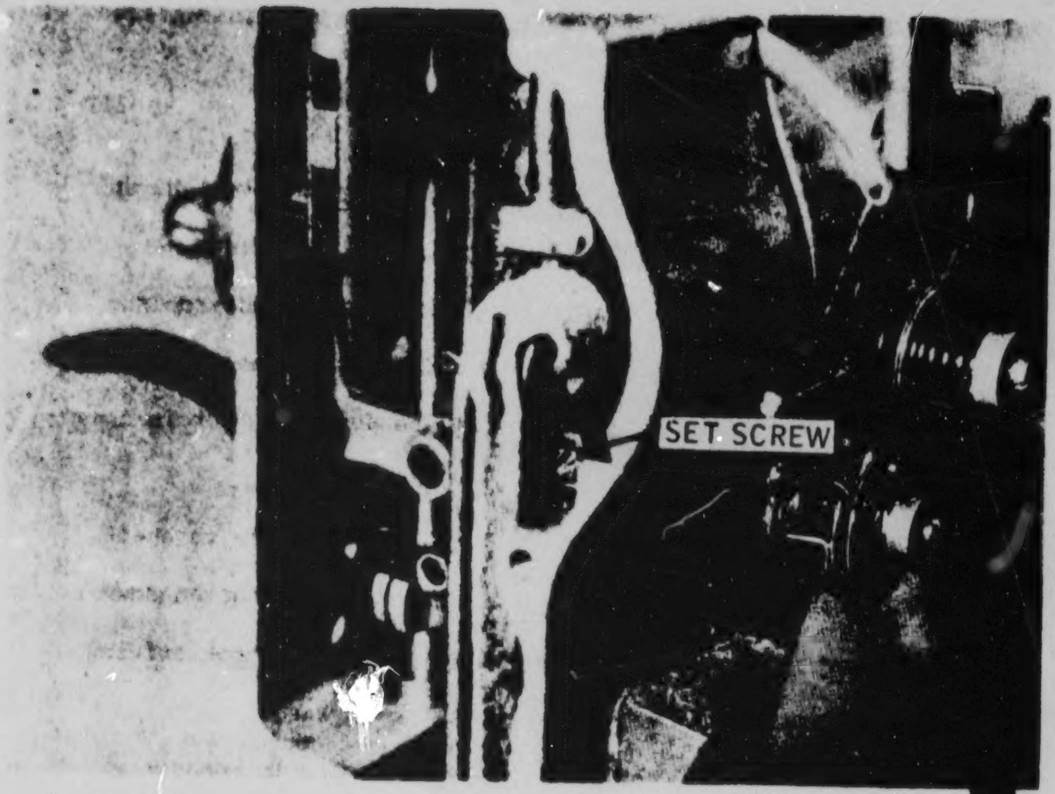

Figure 92. Loosening needle bar connecting stud pinch screw.

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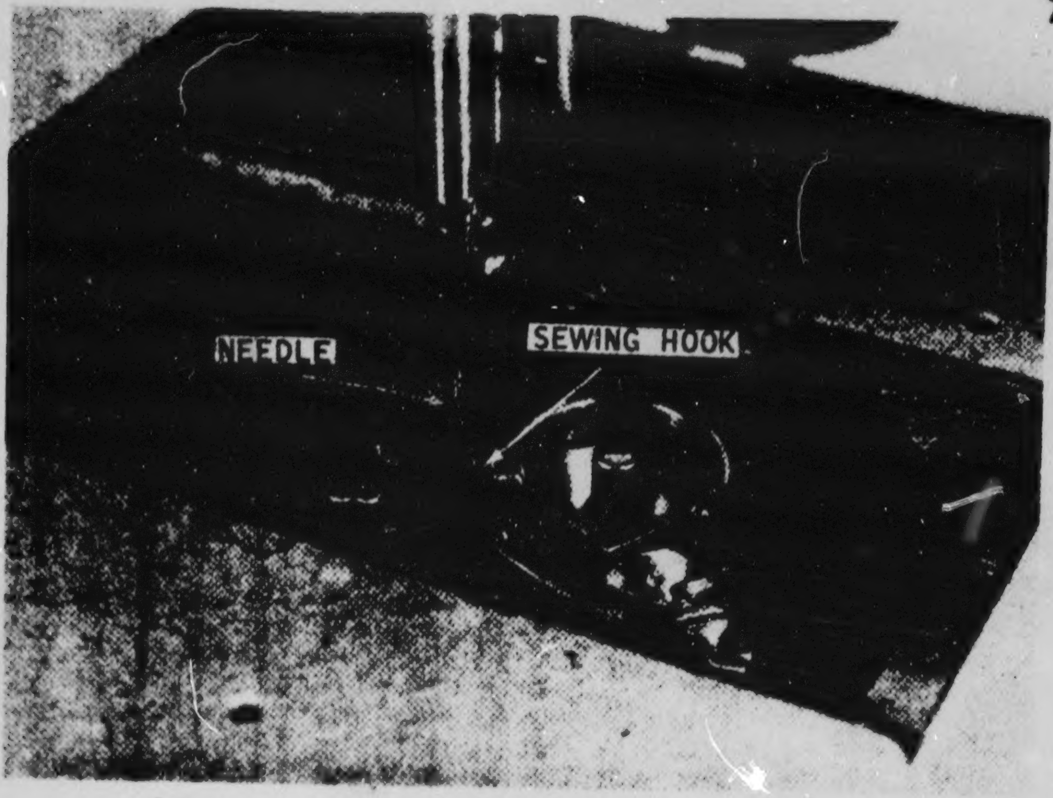
NEEDLE
SEWING HOOK

Figure 93. Centering point of sewing hook with needle. Under normal procedures the lifting and vibrator presser foot is not removed.

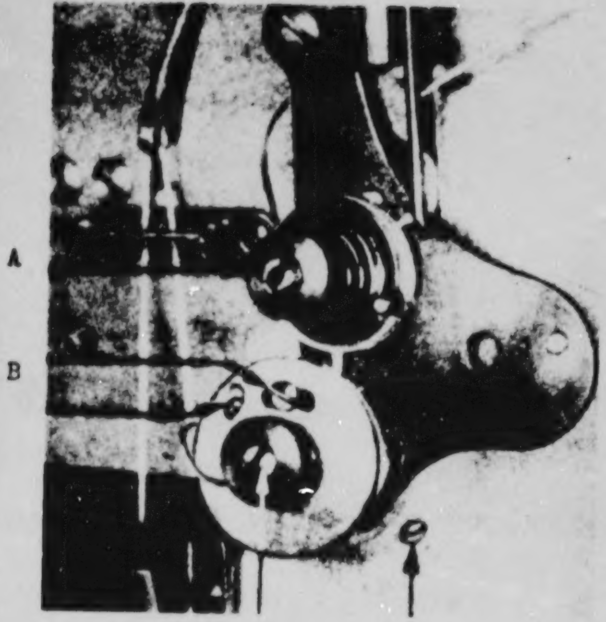

Figure 94 . To adjust the needle thread tension, turn thumb knob to the right to increased, turn knob to the left to decrease the tension (on A).
To adjust the thread controller spring loose screws, move the disc to the right or left until thread has a light tension. (on B)

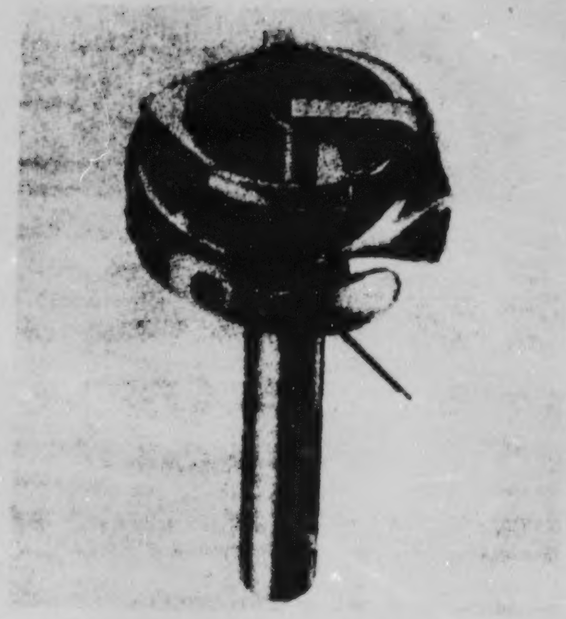

Figure 94 A . To adjust the bobbin thread tension turn screw to the right to increase and to the left to decrease.

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U. S. ARMY QUARTERMASTER SCHOOL

LEARNING/PERFORMANCE GUIDE QMS 244.22 L/PG

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-10 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Troubleshooting Medium Duty Machine

TYPE: Programed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Medium duty sewing machine, Tool kit, Thread, Needles, Salvage canvas mateial, and QMS 244.22 L/PG (Student Learning and Performance Guide)

TRAINING AIDS: QMS 244.W1, Part I, Section XXII; Medium duty sewing machine

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Para 116-130, and QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, August 1972, Section XXII

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part I, Pgs 22.01-22.03

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I

PROPONENT DEPARTMENT: Petroleum and Field Services

NOVEMBER 1974

APPROVED BY C, CURR BR.,
TH DIV, DCTAE
1975

LESSON TITLE: Troubleshooting Medium Duty Machine

YOUR OBJECTIVE: As a result of this instruction, given this Learning and Performance Guide, appropriate references, medium duty sewing machine, tool kit, needles, salvage canvas material and lubricants, you will be able to detect and correct malfunctions on model medium duty sewing machine in accordance with standards prescribed in TM 10-3530-203-10, paras 116-130, and QMS 244.W1, Part I, Section XXII.

INTRODUCTION: Troubleshooting is an action taken by the operator to detect and correct malfunctions. If these malfunctions are not corrected, not only will the machine sew improperly but major damage could result to the machine. By sewing a test patch, the stitch row will indicate if there is a malfunction on the machine. For example: if the lock of the stitch is on the top of the material, the tension is too tight. If the lock of the stitch is on the bottom of the material, the tension is too loose.

DIRECTIONS:

1. Malfunctions have been intentionally created by your instructor. To correct these malfunctions you may need:

    a. Tool kit.

    b. Thread.

    c. Needles.

2. First, read pages 22.01 - 22.03 carefully.

3. Now, inspect the machine to determine all malfunctions.

4. With power source off, make the corrections as directed in QMS 244.W1, Part I, Section XXII (Student Workbook). If necessary, refer to Sections XX and XXI for review.

5. Test operate the machine only after the instructor has checked the machine to assure all malfunctions have been corrected.

6. The instructor will sign your progression sheet when you have achieved your objective.

7. Having completed all lessons on the medium duty sewing machine, you are ready to demonstrate your ability to: prepare the machine for operation, perform maintenance, and make all operator's adjustments. You will be given a performance examination guide which is quite similar to your learning and performance guides. Before asking for the examination guide, you may wish to review Sections XX, XXI, and XXII in your Student Workbook.

SECTION XXII

TROUBLESHOOTING MEDIUM DUTY SEWING MACHINE

PRACTICAL EXERCISE

I. **Purpose and Scope.**

The instruction in this section is on troubleshooting the medium duty model sewing machine to detect and/or correct all malfunctions. To be a good equipment operator you must know how to troubleshoot your equipment. If you are driving down the highway in your vehicle and you noticed a noise, you would stop and check to see what is causing it. The sewing machine is no different than your car. The purpose of this period of instruction is to teach you the appropriate methods of detecting and correcting malfunctions of the medium duty sewing machine to prevent a major breakdown or serious damage to the machine. One of your jobs as canvas repairmen will be to keep your sewing machine in good operating condition.

II. Reference.

TM 10-3530-203-10.

III. Performance Standards.

In this section a performance standard is the actual performance of correcting the malfunctions. Therefore, check your performance by referring to the corrections next to each malfunction listed to the left of the page in para IV below.

IV. Troubleshooting the Medium Duty Sewing Machine.

A. Needle Breakage.

1. Needle is loose in clamp - Tighten needle.

2. Needle is of wrong class or variety - Use correct needle (135x17).

3. Presser foot is loose - Tighten presser foot.

B. Bobbin Thread Breaks.

1. Thread is damp or defective - Use dry, smooth thread.

2. Bobbin tension is too great - Adjust bobbin tension.

3. Bobbin is incorrectly threaded - Thread bobbin thread correctly.

4. Bobbin is wound unevenly, too loose, or too full to revolve freely - Reset bobbin winder to wind bobbin correctly.

C. Stitches Skip or Fail to Lock.

1. Needle is incorrectly installed - Install needle properly (long groove to left).

2. Needle bar is out of adjustment - Adjust needle bar in conjunction with sewing hook.

D. Thread Balls up Under the Throat Plate.

Thread tension is out of adjustment - Adjust thread tension.

E. Stitch is too Loose.

Thread tension loose - Adjust tension.

F. Seams Draw.

1. Thread tension is too tight - Adjust tension.

2. Operator is feeding material at improper speed - Feed material in relation with speed of machine. Do not hold back on material.

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G. Stitches are Uneven or Pile Up.

1. Not enough pressure on presser foot - Increase pressure.

2. Feed dog too low - Report this condition to supervisor.

H. Feed Dog Strikes Throat Plate.

Feed dog out of adjustment - Report this condition to supervisor.

I. Lamp Does Not Light When Switch is in the "ON" Position.

1. Light cord is not plugged into the electrical power receptacle - Plug cord into the electrical power receptacle.

2. Light cord is broken - Report it to supervisor.

3. Incandescent lamp (bulb) is burned out - Replace lamp.

4. Lamp assembly or switch is defective - Report it to supervisor.

5. Electrical power receptacle is defective - Report it to supervisor.

J. Motor Does Not Start When Switch is in "ON" Position.

1. Probable cause can be one of the following: power cable is broken; switch is defective; motor is defective. Notify the supervisor.

2. Power cable is not plugged into electrical power - Plug it in.

K. Motor Does Not Pull Load.

Drive belt slipping; improper voltage or faulty motor - Report to the supervisor.

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U. S. ARMY QUARTERMASTER SCHOOL
PERFORMANCE EXAMINATION GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: C-11 Operator Maintenance of Sewing Machines

INSTRUCTIONAL UNIT: Medium Duty Sewing Machine Examination

TYPE: Examination

TOOLS, EQUIPMENT AND MATERIALS: Medium duty sewing machine, Thread, Needles, Tool Kit, Salvage Canvas, Solvent compound, Sash brush, Cleaning materials, Lubricants, Rags, and Needle and Thread Chart.

TRAINING AID: Medium Duty Sewing Machine

REFERENCES: TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966, Para's 35-37, 51-56, and 116-130; QMS 244.W1, Canvas and Webbed Equipage Repair Course, Part I, Aug 1972, Sections XIX-XXII.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

NOVEMBER 1974

CW-C-11

EXAMINATION TITLE: Medium Duty Sewing Machine Examination

YOUR OBJECTIVE: Given medium duty sewing machine, thread, needles, tool kit, salvage canvas, solvent compound, sash brush, cleaning materials, lubricants, rags, needle and thread chart, and appropriate references, you are to be able to prepare machine for operation, perform maintenance and make all operator's adjustments; examination covers material in Blocks C-2, C-8, C-9, and C-10 in accordance with standards prescribed in TM 10-3530-203-10, Para's 35-37, 51-56, and 116-130 and QMS 244.W1, Part I, Sections XIX-XXII.

INTRODUCTION: This exam contains nothing new, nothing designed to trick you. You've done every task before. We're not testing your ability to memorize or to spell and punctuate correctly. We're allowing you to show that you can operate, adjust, and maintain the light duty sewing machine. Your instructor believes that you are now capable of successfully performing the examination tasks without his assistance. Should you need to review a procedure, refer to your reference materials -- the sections or paragraphs are listed on the cover sheet.

DIRECTIONS:

1. Prior to starting your examination, your instructor will unthread the needle and bobbin thread on your machine.

2. You will need the following tools and materials to accomplish your examination objective:

    a. Medium duty sewing machine.

    b. Tool kit.

    c. Thread.

    d. Needle and Thread Chart.

    e. Canvas material.

    f. Appropriate references.

    g. Sash brush.

    h. Solvent compound.

    i. Lubricants.

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j. Rags.

k. DA Form 2404, attached to the machine.

3. Remember to observe all safety precautions and to use your tools and equipment in a manner which will prevent accidents.

4. You are to perform the following tasks:

a. Thread with needle and bobbin thread.

b. Install the bobbin correctly.

c. Adjust and time the needle bar.

d. Adjust the presser foot.

e. Adjust the thread unwinder tension.

f. Adjust the stitch regulator.

g. Adjust the bobbin tension.

h. Remove and install the needle.

i. Lubricate the machine.

j. Clean the machine.

k. Fill out DA Form 2404.

{NOTE: WHILE YOUR INSTRUCTOR MAY NOT HELP YOU PERFORM THESE EXAMINATION TASKS; IF YOU HAVE ANY QUESTIONS ABOUT WHAT YOU ARE EXPECTED TO DO, RAISE YOUR HAND.}

5. After you have finished all your tasks, your instructor will check and evaluate your work. He will point out any errors and demonstrate corrective procedures.

6. Test operate the machine and leave a test patch in the machine to indicate that the machine is functioning properly. Turn off the power switch; place the cover over the machine; and police up the immediate work area.

7. Your instructor will now sign your progression sheet and assign you to your next lesson.

U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
MEDIUM DUTY SEWING MACHINE EXAMINATION FR-I-11

STUDENTS' EXAMINATION OBJECTIVE: Prepare machine for operation, perform maintenance, and make all operator's adjustments.

DIRECTIONS:

1. Materials Required:

   a. Learning Performance Guide (FR-I-11 PE1-1).

   b. Deviation Sheet (FR-I-11-E2).

   c. Exam Record Sheet (TRADOC Form 533 R).

   d. Medium duty sewing machine.

   e. Tool kit.

   f. Needle and thread chart.

   g. Canvas materials.

   h. Sash brush.

   i. Solvent compound.

   j. Lubricants.

   k. Rags.

   l. Thread.

   m. DA Form 2404, attached to machine.

2. Examination Tasks:

   a. Thread with needle and bobbin thread.

   b. Install the bobbin correctly.

   c. Adjust and time the needle bar.

   d. Adjust the presser foot.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES
AUGUST 1976
THIS GRADE SHEET SUPERSEDES CW-C-11 GS DATED MARCH 1974

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e. Adjust the thread unwinder tension.

f. Adjust the stitch regulator.

g. Adjust the bobbin tension.

h. Remove and install the needle.

i. Lubricate the machine.

j. Clean as required.

k. Fill out DA Form 2404.

3. Scoring Procedures:

a. Use Deviation Rating Sheet (FR-I-11-E2) to determine the student's performance on each item.

b. Enter each student's name at the top of a column.

c. Under each student's name, record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score (columns 34-38), locate the raw score (student's total points) on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (FR-I-11-E2). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting. File grade sheet in class record file.

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FR-I-1--E2

U. S. ARMY QUARTERMASTER SCHOOL
GRADING SHEET

PERFORMANCE EXAMINATION

FABRIC REPAIR COURSE

GRADE SHEET

MEDIUM DUTY SEWING MACHINE

		NAME OF STUDENT						
Maximum Possible Score 66 Minimum Passing Score 46	VALUE							
A. THREADING								
1. Threading Needle Thread	14							
2. Needle threaded properly	2							
3. Bobbin wound properly	5							
4. Bobbin installed properly	5							
B. ADJUSTMENTS								
1. Needle Bar adjusted properly	5							
2. Presser foot adjusted properly	2							
3. Thread unwinder tension correct	2							
4. Stitch length adjusted properly (8 to 10 Stitches per Inch)	5							
5. Bobbin thread tension correct	5							
6. Needle Installed correctly	5							
C. MAINTENANCE								
1. Lubrication	5							
2. Overall cleanliness	3							
3. DA Form 2404 filled out	3							
D. GENERAL								
1. Care of tools and equipment	2							
2. Students regard for safety	3							
TOTAL	66							

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U. S. ARMY QUARTERMASTER SCHOOL
LEARNING PERFORMANCE GUIDE

COURSE: Fabric Repair

ANNEX: I-12, Canvas Repair Sewing Machines

INSTRUCTIONAL UNIT: Preparation of heavy duty sewing machine for operation, models 144W304 and 145W304

TYPE: Programmed Instruction and Practical Exercise I

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT AND MATERIALS: Heavy duty sewing machines, Models 144W304 and 145W304, threads, needles, tool kit, lubricants, cleaning solvents, rage and student's learning/performance guide, QMS 244.51 PE1-1

TRAINING AIDS: Sewing machines, Heavy duty (long arm) QMS 244.1WB-1, Section XXXI, Part 1, dated Jan 76, Student Learning/ Performance Guide, QMS 244.51 PE1-1.

REFERENCES: TM DGSC - 3530-79 and 80, QMS 244.1WB-1, Part I, Section XXXI, dated Jan 76

STUDY ASSIGNMENT: Recommended read QMS 244.1WB-1, Section XXXI, Part I, Jan 76

STUDENT UNIFORM AND EQUIPMENT: Wear fatigues and bring all issued references to class.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1976

LESSON TITLE: Preparation of heavy duty sewing machines for operation models 144W304 and 145W304.

OBJECTIVE: As a result of this instruction, given references, student workbook, section XXXI, Part I, heavy duty sewing machines (long arm), bobbins, threads, tool kit, and needles will be able to prepare sewing machines models 144W304 and 145W304 for operation in accordance with standards prescribed in TM DGSC -3530-79 and 80 and QMS 244.1WB-1, Section XXXI.

INTRODUCTION: As Fabric repairmen you will be required to operate many different types and models of sewing machines. These machines are not too much different in design than the machines you are accustomed to operating in previous phases of the course. The biggest difference is the length of the sewing bed. This is an advantage as it allows you to place wide layers of material under the arm of the machine for ease of sewing. The two needle machine has an advantage over single needle machines as this will allow you to sew two rows of stitches at one time, rather, than one row on the single needle machine.

DIRECTIONS

1. The instructor will issue to you the following items:
   a. Thread
   b. Needles
   c. Bobbins
   d. Tool kit
   e. Heavy duty sewing machine (long arm) Model 144W304
   f. Heavy duty sewing machine (long arm) Model 145W304.
   g. Lubricants

NOTE: Practice safety precautions at all times.

2. Read QMS 244.1WB-1, Section XXXI and perform the following operations:
   a. Threading with needle threads
   b. Cleaning and oiling
   c. Removing the bobbin
   d. Removing and replacing needles

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e. Winding the bobbin

f. Lubricate the machine

3. The instructor will rotate you from one type of machine to the other.

4. Your classroom instructor will give assistance if required. Raise your hand to avoid distracting other students that may be watching tapes or studying lessons from programmed texts.

5. Ask your classroom instructor to check and evaluate your work.

6. Your classroom instructor must sign your student progression sheet before you may go on to the next lesson.

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QMS 244.52 PE1-1

U. S. ARMY QUARTERMASTER SCHOOL

LEARNING PERFORMANCE GUIDE

COURSE: Fabric Repair

ANNEX: I-13 Canvas Repair Sewing Machines

INSTRUCTIONAL UNIT: Adjustment, Troubleshooting, and Operation of Heavy Duty Sewing Machines, Models 144W304 and 145W304

TYPE: Programmed Instruction and Practical Exercise Hardware

CLASS PRESENTED TO: Enlisted

TOOLS, EQUIPMENT AND MATERIALS: Heavy Duty sewing Machines, Models 144W304 and 145W304, Thread, Needles, Tool Kit, Lubricants, Cleaning Materials and QMS 244.52 PE1-1

TRAINING AIDS: Sewing Machines, Heavy Duty (long arm) Models 144W304 and 145W304, and QMS 244.1WB-1, Section XXXI, Student Workbook dated Jan 76.

REFERENCES: Manufacturer's Manual TM DGSC - 3530-79 and 80 and QMS 244.1WB-1, Section XXXI, Student Workbook dated Jan 76

STUDY ASSIGNMENT: Recommended: Read QMS 244.1WB-1, Section XXXI Student Workbook dated Jan 76

STUDENT UNIFORM AND EQUIPMENT: Wear fatigues and bring to class all issued references

PROONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

APRIL 1976

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LESSON TITLE: Adjustments, Troubleshooting and Operation of Heavy Duty Sewing Machines, Models 144W304 and 145W304

OBJECTIVE: As a result of this instruction, given references, heavy duty sewing machines, models 144W304 and 145W304, salvage canvas, thread, needles, lubricants, cleaning materials and appropriate references, will be able to operate, troubleshoot, and adjust sewing machines, models 144W304 and 145W304 in accordance to standards prescribed in QMS 244.1WB-1, Section XXXI, student workbook dated Jan 76, and manufacturer's manual TM DGSC - 3530-79 and 80.

INTRODUCTION: This machine is unlike the other machines you have had so far, as it has two needles. This machine is a little more difficult to adjust the thread tensions and to have the needles placed exactly right in order to pick up the bobbin threads. This machine is also harder to operate, as you have to feed two pieces of material into the machine at one time from two separate directions.

REVIEW: During this block you will be duplicating some of the work that you have performed on other machines that you have used. During the last block you were taught how to prepare the heavy duty sewing machines for operation, and this block you are concerned with operation, troubleshooting and adjustments of the heavy duty sewing machines (long arm). Only one of these machines will differ to any great degree, the model 145W304 has a double needle and sews two rows of stitches at once while the other machine is a one needle machine and sews a single row of stitches.

DIRECTIONS TO THE STUDENT FOR SELF-PACING.

1. The instructor will issue you the following listed items:

   a. Thread

   b. Needles

   c. Bobbins

   d. Tool Kit

   e. Heavy duty sewing machines (long arm) 144W304 and 145W304

   f. Lubricate

   g. Cleaning materials

2. Read QMS 244.1WB-1, Section XXXI, student workbook and perform as directed:

   a. Adjust the machine:

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(1) Adjust the needle thread tension

(2) Adjust the bobbin thread tension.

(3) Adjust the presserfoot pressure

(4) Adjust the stitch length

b. Operate the machines

3. Continue on your self-paced lesson at your own speed and your classroom instructor will give you assistance if required, hold your hand up to prevent disturbing other students that may be watching tapes and your instructor will come as quickly as possible.

4. Perform in a safe manner at all time being sure to observe all previously taught precautions. One, be sure the power switch is in the off position before performing adjustments on these machines.

5. Ask your classroom instructor to check and evaluate your work as required.

6. Your classroom isntructor will sign your progression chart before advancing you to the next lesson.

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U. S. ARMY QUARTERMASTER SCHOOL

LEARNING PERFORMANCE GUIDE

COURSE: Fabric Repair

ANNEX: I-14, Canvas Repair Sewing Machines

INSTRUCTIONAL UNIT: Heavy Duty Sewing Machines Examination, Models 144W304 and 145W304

TYPE: Examination

TOOLS, EQUIPMENT AND MATERIALS: Heavy duty sewing machine {Model 144W304}, Heavy duty sewing machine {Model 145W304}, Thread, Needles, Tool Kit, Salvage canvas, Solvent compound, Sash brush, Cleaning materials, Lubricants, Rags, and Needle and Thread Chart

TRAINING AID: Heavy Duty Sewing Machine {Model 144W304}, Heavy Duty Sewing Machine {Model 145W304}

REFERENCES: TM DGSC 3530-79; TM DGSC 3530-80, Sec XXXI, QMS 244.1 WB 1 Part I

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring QMS 244.W1, Part I.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

SEPTEMBER 1976

This learning performance guide supersedes CW-C-21 dated Nov 74.

EXAMINATION TITLE: Heavy Duty Sewing Machines Examination, Models 144W304 and 145W304.

YOUR OBJECTIVE: Given heavy duty sewing machine {Model 144W304}, heavy duty sewing machine {Model 145W304}, thread, needles, tool kit, salvage canvas, solvent compound, sash brush, cleaning materials, lubricants, rags, needle and thread chart, and appropriate reference materials, you are to be able to demonstrate ability to prepare machines for operation, perform maintenance, and make all operator's adjustments; examination covers material in Blocks I-12 and I-13 in accordance with standards prescribed in TM DGSC 3530-79 and 80 and QMS 244.1 W-T, Part 1.

INTRODUCTION: The heavy duty sewing machines, Models 144W304 and 145W304 are the newest and the most complicated of the sewing machine models which you may be required to operate in your field assignment. Therefore, it is important that you determine now whether you have acquired the skills necessary to operate, adjust, and maintain these machines.

DIRECTIONS:

1. You will need the following tools and materials to accompli your examination objective:

   a. Heavy duty sewing machine {Model 144W304}/Heavy duty sewing machine {Model 145W304}

   b. Tool kit.

   c. Thread.

   d. Needle and Thread Chart.

   e. Canvas material.

   f. Appropriate references.

   g. Sash brush.

   h. Solvent compound.

   i. Lubricants.

   j. Rags.

   k. DA Form 2404, attached to each machine.

2. Prior to starting your examination, your instructor will unthread the needle and bobbin thread on each machine.

3. Remember to observe all safety precautions and to use your tools and equipment in a manner which will prevent accidents.

4. Perform the following tasks:

   a. Thread with needle and bobbin thread{s}.

   b. Install bobbin{s} correctly.

   c. Adjust and time the needle bar.

   d. Adjust the presser foot.

   e. Adjust the thread unwinder tension.

   f. Adjust the stitch regulator.

   g. Adjust the bobbin tension.

   h. Remove and install needle{s}.

   i. Lubricate the machine.

   j. Clean the machine.

   k. Fill out DA Form 2404.

{NOTE: WHILE YOUR INSTRUCTOR MAY NOT HELP YOU PERFORM THESE EXAMINATION TASKS; IF YOU HAVE ANY QUESTIONS ABOUT WHAT YOU ARE EXPECTED TO DO, RAISE YOUR HAND.}

5. After you have finished all your tasks for a machine, your instructor will check and evaluate your work for that machine. He will point out any errors and demonstrate corrective procedures.

6. Test operate the machine and leave a test patch in the machine to indicate that the machine is functioning properly. Turn off the power switch; place the cover over the machine; and police up the immediate work area.

7. Upon assignment to the second machine, return to step 4 and perform as directed in 4, 5, and 6.

8. Upon successful completion of the performance examination, your instructor will sign your progression sheet and assign your next lesson.

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U. S. ARMY QUARTERMASTER SCHOOL

Deviation Rating Sheet
for
HEAVY DUTY SEWING MACHINES EXAMINATION, MODELS 144W304 AND 145W304

This deviation rating sheet is used to rate the student's performance on the Heavy Duty Sewing Machines Examination, Models 144W304 and 145W304 and will be used in conjunction with the grade sheet (CW-C-21 GS).

Refer to the grade sheet for scoring procedures.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

DECEMBER 1974

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CW-C-21 DS

U.S. ARMY QUARTERMASTER SCHOOL
DEVIATION SHEET

PERFORMANCE EXAMINATION

CANVAS AND WEBBED EQUIPAGE REPAIR COURSE

HEAVY DUTY SEWING MACHINES (Models 144W304 & 145W304) DEVIATION SHEET

MAXIMUM POSSIBLE SCORE: 127 MINIMUM PASSING SCORE: 89	VALUE	ANY DEVIATION	MINUS 1 to 4	MINUS 2 PLUS 2	TOO TIGHT, TOO LOOSE, TOO FULL	TOO HIGH 1/8 TOO LOW 1/8	TOO HIGH 1/16 TOO High 1/16	ANY GREATER DEVIATION		
A. THREADING - Model 144W304										
1. Threading Needle Thread.	14		1-4					14		
2. Needle threaded properly	2	2								
3. Bobbin wound properly	5				3			5		
4. Bobbin installed properly	5		1-4					5		
B. ADJUSTMENTS - Model 144W304										
1. Needle bar adjusted properly	5					3	2	5		
2. Presser foot adjusted properly.	2	2								
3. Thread unwinder tension correct.	2	2								
4. Stitch length adjusted properly (5 to 7 per inch)	5			3				5		
5. Bobbin thread tension correct.	5				3			5		
6. Needle installed correctly.	5	5								
C. MAINTENANCE - Model 144W304										
1. Lubrication	5	5								
2. Overall cleanliness	3	3								
3. DA Form 2404 filled out.	3	3								
D. THREADING - Model 145W304										

DEVIATION SHEET

	VALUE	ANY DEVIATION	MINUS 1 to 4	MINUS 2 PLUS 2	TOO TIGHT, TOO LOOSE, TOO FULL	TOO HIGH 1/8 TOO LOW 1/8	TOO HIGH 1/16 TOO LOW 1/16	ANY GREATER DEVIATION		
1. Threading Needle Threads	14		1-4					14		
2. Needles threaded properly	2	2								
3. Bobbins wound properly	5				3			5		
4. Bobbins installed properly	5		1-4					5		
E. ADJUSTMENTS - Model 145W304										
1. Needle bar adjusted properly	5					3	2	5		
2. Presser foot adjusted properly.	2	2								
3. Thread unwinder tension correct.	2	2								
4. Stitch length adjusted properly (5 to 7 per inch)	5			3				5		
5. Bobbin thread tension correct.	5				3			5		
6. Needles installed correctly.	5	5								
F. MAINTENANCE - Model 145W304										
1. Lubrication	5	5								
2. Overall cleanliness	3	3								
3. DA Form 2404 filled out	3	3								
G. GENERAL										
1. Care of tools & equipment	2	2								
2. Regard for safety	3									
TOTAL	127									

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CW-C-21 DS

RAW SCORE CONVERSION SHEET

Raw Score	Percent	Raw Score	Percent
127	10000	83	06535
126	09921	82	06457
125	09843	81	06378
124	09764	80	06299
123	09685	79	06221
122	09606	78	06142
121	09528	77	06063
120	09449	76	05984
119	09370	75	05906
118	09291	74	05827
117	09213	73	05748
116	09134	72	05669
115	09055	71	05591
114	08976	70	05512
113	08898	69	05433
112	08819	68	05354
111	08740	67	05276
110	08661	66	05197
109	08583	65	05118
108	08504	64	05039
107	08425	63	04961
106	08347	62	04882
105	08268	61	04803
104	08189	60	04724
103	08110	59	04646
102	08032	58	04567
101	07953		
100	07874		
99	07795		
98	07717		
97	07638		
96	07559		
95	07480		
94	07402		
93	07323		
92	07244		
91	07165		
90	07087		
89	07008		
88	06929		
87	06850		
86	06772		
85	06693		
84	06614		

U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
HEAVY DUTY SEWING MACHINES EXAMINATION, MODELS 144W304 AND 145W304

STUDENTS' EXAMINATION OBJECTIVE: Demonstrate ability to prepare machines for operation, perform maintenance, and make all operator's adjustments.

DIRECTIONS:

1. Materials Required.

   a. Performance Examination Guide (CW-C-21 H1).

   b. Deviation sheet (CW-C-21 DS).

   c. Examination Record Sheet (TRADOC Form 533 R).

   d. Heavy duty sewing machine (Model 144W304).

   e. Heavy duty sewing machine (Model 145W304).

   f. Tool kit.

   g. Needles.

   h. Canvas material.

   i. Solvent compound.

   j. Lubricants.

   k. Sash brush.

   l. DA Form 2404, attached to machine.

2. Examination Tasks:

   a. Thread Model 144W304.

   b. Perform adjustments (Model 144W304).

   c. Perform maintenance (Model 144W304).

   d. Thread model 145W304.

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DECEMBER 1974

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e. Perform adjustments (Model 145W304).

f. Perform adjustments (Model 145W304).

3. Scoring Procedures:

a. Use Deviation Rating Sheet (CW-C-21 DS) to determine the student's performance on each item.

b. Enter each student's name at the top of each column.

c. Under each student's name, record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score, locate the raw score on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (CW-C-21 DS). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting. File grade sheet in class record file.

CW-C-21 GS

U.S. ARMY QUARTERMASTER SCHOOL
GRADING SHEET

PERFORMANCE EXAMINATION

CANVAS AND WEBBED EQUIPAGE REPAIR COURSE

GRADE SHEET

HEAVY DUTY SEWING MACHINES (Models 144W304 & 145W304)

NAME OF STUDENT

MAXIMUM POSSIBLE SCORE: 127
MINIMUM PASSING SCORE: 89

	VALUE									
A. THREADING - Model 144W304										
1. Threading Needle Thread	14									
2. Needle threaded properly	2									
3. Bobbin wound properly	5									
4. Bobbin installed properly	5									
B. ADJUSTMENTS - Model 144W304										
1. Needle Bar adjusted properly	5									
2. Presser foot adjusted properly	2									
3. Thread unwinder tension correct	2									
4. Stitch length adjusted properly (5 to 7 per inch)	5									
5. Bobbin thread tension correct	5									
6. Needle installed correctly	5									
C. MAINTENANCE - Model 144W304										
1. Lubrication	5									
2. Overall cleanliness	3									
3. DA Form 2404 filled out	3									
D. THREADING - Model 145W304										

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	VALUE	NAME OF STUDENT								
1. Threading Needle Threads	14									
2. Needles threaded properly	2									
3. Bobbins wound properly	5									
4. Bobbins installed properly	5									
E. ADJUSTMENTS - Model 145W304										
1. Needle Bar adjusted properly	5									
2. Presser foot adjusted properly	2									
3. Thread unwinder tension correct	2									
4. Stitch length adjusted properly (5 to 7 per inch)	5									
5. Bobbin thread tension correct	5									
6. Needles installed correctly	5									
F. MAINTENANCE - Model 145W304										
1. Lubrication	5									
2. Overall cleanliness	3									
3. DA Form 2404 filled out	3									
G. GENERAL										
1. Care of tools & equipment	2									
2. Regard for safety	3									
TOTAL	127									

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QMS 244.46 L/PG

U. S. ARMY QUARTERMASTER SCHOOL
LEARNING/PERFORMANCE GUIDE

COURSE: Canvas and Webbed Equipage Repair

ANNEX: F-2 Repair Shop Operations

INSTRUCTIONAL UNIT: Canvas and Webbed Repair Shop Operations and Examination

TYPE: Programmed Instruction, Practical Exercise Hardware, and Examination

CLASS PRESENTED TO:: Enlisted

TOOLS, EQUIPMENT, AND MATERIALS: Heavy duty, medium duty, and light duty sewing machines; Tool kit; Various weights of new and salvage canvas; Cleaning materials; Lubricants; DA Forms 2407, 2405, and 2404; and Special tools and equipment.

TRAINING AIDS: QMS 244.W1, Parts 1, II, and III; Work Order Register DA Form 2405; DA Form 2407; and Repairable canvas and webbed items.

REFERENCES: AR 32-15, Classification and Inspection, April 1966; FM 10-16, General Repair of Tents, Canvas and Webbing, April 1974; TM 10-3530-203-10, Operator's Manual, Textile Repair Shop, Trailer-Mounted, April 1966; TM 10-3530-203-24, Organizational and Maintenance Manual, Textile Repair Shop, Trailer-Mounted, June 1966; TM 10-8400-201-23, Organizational and Direct Support Maintenance Manual, General Repair Procedures for Clothing and Individual Equipment, June 1970; TM 38-750, The Army Maintenance Management System (TAMMS), Nov 1972; and QMS 244.W1, Parts I, II, and III.

STUDY ASSIGNMENT: Recommended: Read QMS 244.W1, Part II, Section XLIII, Pgs. 43.01-43.09.

STUDENT UNIFORM AND EQUIPMENT: Fatigues. Bring all issued references.

PROPONENT DEPARTMENT: PETROLEUM AND FIELD SERVICES

DECEMBER 1974

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JAN 28 1975

LESSON TITLE: Canvas and Webbed Repair Shop Operations and Examination

YOUR OBJECTIVE: As a result of this instruction, given QMS 244.W1 ; heavy duty, medium duty, and light duty sewing machines; tool kit; various canvas and webbed items in need of repair; cleaning materials; lubricants; and special tools and materials; and DA Forms 2407, 2405, and 2404, you will be able to demonstrate ability to set up and operate a canvas and webbed repair shop. Examination covers material in blocks F-1 and F-2. Students' performance will be in accordance with standards prescribed in AR 32-15; FM 10-16; TM 10-3530-203-10; TM 10-3530-203-24; TM 10-8400-201-23; TM 38-750; and QMS 244.W1, Parts I, II, and III.

INTRODUCTION: In the field or in a theater of operation, your primary mission will be to repair tentage or webbed items for return to the user or for return to stock and ultimate reissue. The fixed shop must be arranged so that there are no bottlenecks in the production line. During the canvas and webbed course, you were taught the repair procedures including maintenance and adjustment of various types of sewing machines. You are now to put these procedures together and to practice applying those principles which you have been taught in previous hours.

DIRECTIONS:

1. Working at your own pace, you are to repair those items which will be furnished by your instructor. These items will vary depending on the work orders that are received in the shop operation.

2. Your instructor will furnish the materials and special tools that are required to accomplish the repair job.

3. You may need to refer to your student workbook for procedures. Check the index in the front of the workbook. NOTE: QMS 244.W1, Part III has repair procedures that you may not have used prior to this phase of instruction. Also refer to QMS 244.W1, Part II, Page 43.08. This drawing illustrates workflow within a repair activity.

4. In addition to repair procedures, you will be required to perform in different job assignments. One job assignment will require you to act as a work order clerk. As such, you will need to maintain a job order register. Use DA Form 2405 to record all items received into the shop.

5. During the later part of this instruction phase, your instructor will assign you to perform certain tasks for grading purposes. These tasks will consist of making repairs to tentage.

SECTION XLIII

CANVAS AND WEBBED REPAIR SHOP OPERATIONS

PRACTICAL EXERCISE

I. Purpose and Scope.

The instruction in this Section, describes the organization, mission and functions of classification and repair operations of a Canvas and Webbed Repair Shop, sequence of work flow, determining job assignments and the duties of personnel for each job assignment necessary to operate the Canvas and Webbed Repair Shop, discusses how to set up a job order register for receiving and processing work order requests, the operating supply procedures, how to determine shop stockage, the control of operating supplies by maintaining an up-to-date accumulation of consumption data, discusses a sample shop layout, and the setting up of a shop for operations with Station #1 (receiving, recording and shipping), Station #2 (inspecting, classifying and marking), Station #3 (repairing) and Station #4 (final inspecting), and assigning men to the various Stations on an alternating basis, and the processing of work requests and items submitted by individuals and units of the post. As a practical exercise you will operate all four Stations and perform necessary operator's maintenance to machines and equipment, and maintain necessary paper work (Job Order Registers, etc.) in repair shop operations.

At one time or another you were told what your assignment would be. Regardless of the position to which you may be assigned it is important that you understand this subject of shop operations.

In the field or in a theater of operations, your primary mission will be to repair tentage and webbed items for return to the user or returned to stock for reissue. This is normally accomplished on a large scale basis, therefore, the most appropriate method would be on a production line basis. In order to operate on a production scale it is necessary to put into practical use all the subjects you have learned.

II. References.

All Previous References.

III. Shop Operations.

A. Preview of the Course Subject Matter in Relation to Shop Operation.

At this time we will briefly discuss the subjects covered in the course up to this point: nomenclature, inspection, and classification of tentage; hand repair methods; operator maintenance of sewing machines; machine sewing of canvas items; repair of canvas and webbed equipage; and repair of body armor.

1. Nomenclature. As repairmen you found it advantageous to have the ability to recognize and know the proper nomenclature of a component of a tent, or from one of various items of canvas and webbed equipment. This knowledge, as you found out, would be to your advantage in that it will allow you to readily locate and replace and/or repair the components with the minimum amount of time.

2. Inspection and Defect Marking. All tentage and canvas items should be clearly marked during the inspection procedures with the appropriate defect marking symbols. During a shop operation set-up, to

have an item clearly marked at the point of the damage area, will enable the repairman to immediately start the repair with little or no lost time.

3. Classification. To know the classification codes and the ability to determine whether a tent or an item of canvas equipage is economically repairable or not, will save the operator a considerable amount of time. If it is beyond repair, it will not be sent to the operator, but should be reclassified into another category such as Class X, and disposed of in the proper manner. It is also possible by error to receive an item that is in a complete state of repair, in which case, it should be classified as such and placed back into the supply system or returned to the user.

4. Hand Repair Methods. You learned that this is also an area of importance during shop operation. It is necessary to know hand sewing methods, as in the event of power failure, it will necessitate the repair of canvas items by hand sewing. Occasionally an item becomes critical during an actual conflict, and when the situation of power failure occurs, then without a doubt, these items will be repaired by hand sewing methods. During this phase you were taught it was also important to be able to determine the proper use of hand tools and implements. It was very obvious to use tools for the purpose for which intended, as it made your job easier and resulted in good workmanship.

5. Operator Maintenance and Operation of Sewing Machines. You were taught, if a sewing machine failed to operate properly, the possible cause was usually traced to poor or neglected preventive maintenance services performed by the operator. A machine that fails to

operate is ineffective, and will hamper the mission of your organization in the repair of canvas and webbed items. It is important that a production line type operation remain fully operational with maximum capabilities. This can be accomplished by performing the operator preventive maintenance services as discussed and practiced throughout the course.

6. Machine Sewing of Canvas Items. During this phase you were taught the characteristics, use, and construction of the seams, hems and patches used in the repair of canvas webbed items, and tentage. You must be able to determine the type patch to be applied in relationship to a damage area of an item, taking into consideration the item and location of the damage. The shape and size of a patch is an important factor to be considered in the repair of tentage and heavy canvas items. The ability to construct an item out of canvas, or to replace a component from a pattern, is time and money saving. To be able to construct an item from patterns as directed, is a mark of a good repairman. You will encounter such tasks in a shop type operation.

7. Maintenance Records. During the shop operation phase in which we are just commencing, it will be necessary to maintain a record system of the work accomplished. You must insure that the maintenance request (DA Form 2407) is filled out properly with the work received. Data from the DA Form 2407 must be provided and placed on the Maintenance Request Register (DA Form 2405). This form (DA 2405) provides a consolidated record of job orders generated, received and processed by maintenance activities.

B. Setting Up Shop Operations.

1. Receiving Items for Repair.

a. The first operation in receiving tentage or webbed items for repairs, is to check DA Form 2407 to see if it has been prepared as required in TM 38-750, and discussed in the previous Section.

b. Maintenance Requests are checked to see if they are filled out correctly and completely by the units making the requests. Insure that all requests are accurate.

2. Repair of Canvas and Webbed Items.

a. The Receiving Clerks will issue items to be repaired to the Repairing Section. (The first number in sequence is repaired first, unless item has a priority number.)

(1) Mark the date of issue to the repairman in Block "G" (Date repair starts.) on Maintenance Request Register (DA Form 2405).

(2) The receiving clerk will put the repairman's name in Block "E" (Remarks Column) and on the same line of the items issued. For example: If tent, shelter half, Number CW-10-1, was issued, then the name of that repairman should be on the same line.

b. The repairman, when issued an item, will be responsible for that item until he has completed the repairs.

(1) He will inspect the item for repairability.

(2) Make and complete necessary repairs.

(3) Replace all missing hardware, grommets, etc.

(4) Show items to the supervisor for workmanship.

(5) Return items after repairing, to the receiving clerk and receive another item for repair.

c. When canvas and webbing items are repaired and returned to the receiving clerk, he will:

(1) Mark the date the item was returned in Block "H" (Date Repair Finished Column) of DA Form 2405.

(2) He will place the item on the proper pallet, or in the bin according to the work order number.

(3) He will issue the repairman another item following the same procedures as described before.

3. Shipping Items Repaired.

a. When all items in the work order are repaired, the receiving clerk will get his paper work ready for the unit.

b. The receiving clerk will call the unit to pick up the repaired items.

c. Have the authorized person who picks up items sign Column 28 (Accepted By) on DA Form 2407, Maintenance Request. Pick up the receipt copy from the Unit, and give the Unit the Control Copy (No.4).

4. Job Assignment and Duties of Personnel. The Shop will be set up for shop operations with the following personnel:

a. Shop Foreman.

b. W/O Clerk.

c. Inspector.

d. Repairmen.

(1) Shop Foreman - assigns personnel to the various operating sections and supervises the performance of their duties.

(2) Work Order Clerk - will be responsible for receiving and shipping of work order requests submitted by individuals or units. Will set up and maintain the job order register.

(3) Inspector - inspects, classifies and marks defects of items for repair. Final inspection, an important factor will be quality of workmanship.

(4) Repairmen - will perform work on items of canvas and webbing as assigned to them, following repair procedures taught.

5. Preventive Maintenance Services. During this exercise you will continue to perform the operator's preventive maintenance service to the sewing machines. You are also required to maintain DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

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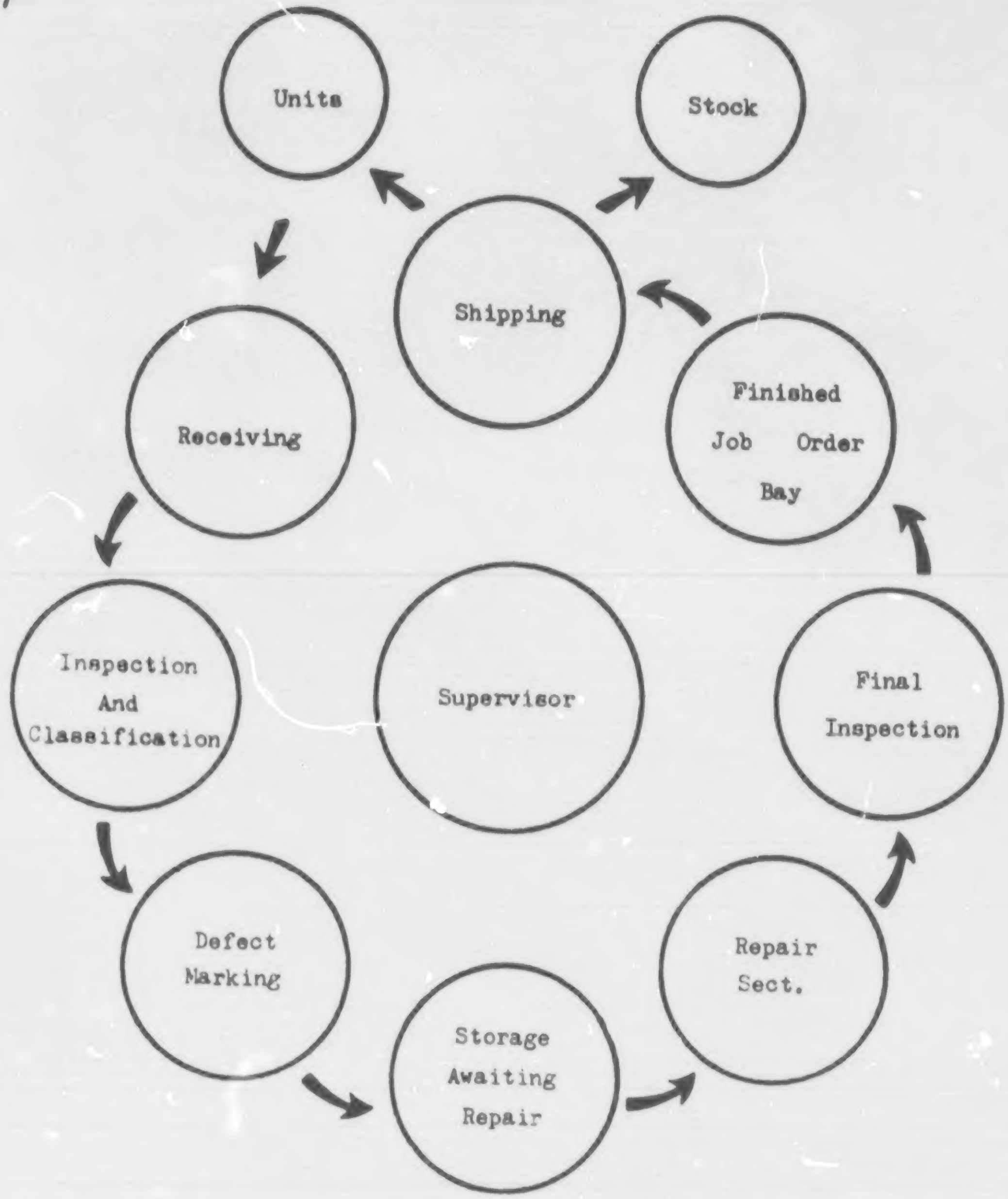
Units
Stock
Shipping
Receiving
Finished Job Order Bay
Inspection And Classification
Supervisor
Final Inspection
Defect Marking
Repair Sect.
Storage Awaiting Repair

WORKFLOW CHART

Figure 172

CANVAS REPAIR SHOP

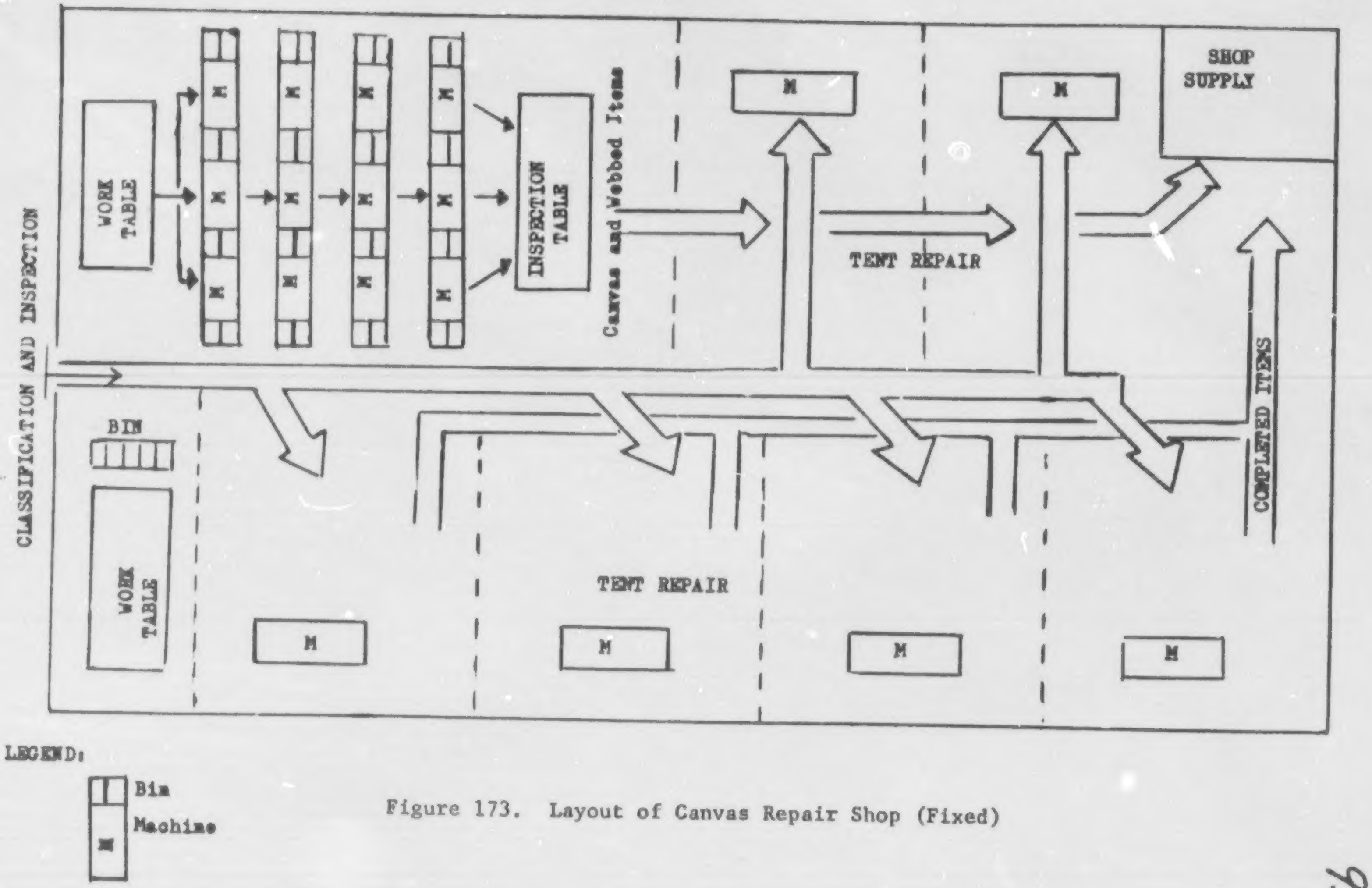
WORK TABLE
M
INSPECTION TABLE
Canvas and Webbed Items
TENT REPAIR
SHOP SUPPLY
CLASSIFICATION AND INSPECTION
BIN
WORK TABLE
TENT REPAIR
COMPLETED ITEMS
LEGEND:
Bin
Machine

Figure 173. Layout of Canvas Repair Shop (Fixed)

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CW-F-2 DS

U. S. ARMY QUARTERMASTER SCHOOL

Deviation Rating Sheet
for
CANVAS AND WEBBED REPAIR SHOP OPERATION AND EXAMINATION

This deviation rating sheet is used to rate the student's performance on the Canvas and Webbed Repair Shop Operation Examination (CW-F-2) and will be used in conjunction with the grade sheet (CW-F-2 GS).

Refer to the grade sheet for scoring procedures.

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CW-F-2 DS
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PERFORMANCE EXAMINATION (Deviation Rating Sheet)

CANVAS AND WEBBED EQUIPAGE REPAIR COURSE

SHOP OPERATIONS

MAXIMUM POSSIBLE SCORE 165

MINIMUM PASSING SCORE 115

	VALUE	Any Deviations	Minus 1/16"	Plus 1/16"	Plus or Minus 1/8"	Minus 1/4"	Plus 1/4"	Irregular 1" to 2" (LGTH)	Irregular over 2" to 3" (LGTH)	Any Greater Deviation
A. WATERSHED PATCH FELLED	X	X	X	X	X	X	X	X	X	X
1. Roof of patch 22½ degree angle	3				1	2	2			3
2. Patch parallel with repaired item	1	1								
3. Patch folded square	1	1								
4. Fold of patch 3/4" under	3				1	2	2			3
5. Corners do not protrude (5)	5	1Ea								
6. Folded (Bottom 1st, Side 2nd, Top 3rd)	5	5								
7. First stitch row 1/8" from edge	3		2	1						3
8. Tacked 1" (2) each	6				1Ea	2Ea				6
9. Tacked in same stitch row	8	4Ea								
10. Patch corners secured (5)	5	1Ea								
11. Machine tension adjusted correctly	4	4								
12. 5 to 7 stitches per inch	2	2								
13. Stitch line straight	6							1	2	3
14. Damage turned under 1/2"	5		1	1	1	3	2			5
15. Corners of damage area secured (5)	5	1Ea								
16. Stitch line 1/8" from edge on damage	3		2	1						3

MAXIMUM POSSIBLE SCORE 165 MINIMUM PASSING SCORE 115	VALUE	Any Deviations	Minus 1/16"	Plus 1/16"	Plus or Minus 1/8"	Minus 1/4"	Plus 1/4"	Irregular 1" to 2" (LGTH)	Irregular over 2" to 3" (LGTH)	Any Greater Deviation
B. NEAR SEAM PATCH TOP PLY	X	X	X	X	X	X	X	X	X	X
1. Roof of patch 22½ degree angle	3				1	2				3
2. Patch squared with Seam	1	1								
3. Patch folded square	1	1								
4. Fold of patch 3/4" under	3				1	2	2			3
5. Corners do not protrude (2)	2	1Ea								
6. Folded (Bottom 1st, Side 2nd, Top 3rd)	5	5								
7. First stitch row 1/8" from patch edge	3		2	1						3
8. 2nd stitch 1/8" to 1/2" from 1st	3		1	1	2					
9. Patch inserted into seam 3/4"	4	4								
10. Finish with two stitch rows (Matching Seams)	3	3								
11. Tacked 1 inch over seam stitches (4 tacks)	8				1Ea	1Ea				2Ea
12. Tacked same stitch row (4)	12	3Ea								
13. Patch corners secure	4	1Ea								
14. Tension adjusted correctly	4	4								
15. 5 to 7 stitches per inch	2	2								
16. Stitch lines straight	12							1Ea	2Ea	3Ea
17. Damage trimmed 1/8" from stitch row	3							1	2	3

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MAXIMUM POSSIBLE SCORE 165 MINIMUM PASSING SCORE 115	VALUE	Any Deviation	Minus 1/16"	Plus 1/16"	Plus or Minus 1/8"	Minus 1/4"	Plus 1/4"	Irregular " to 2" (LGTH)	Irregular Over 2" to 3" (LGTH)	Any Greater Deviation
C. GENERAL	X	X	X	X	X	X	X	X	X	X
1. Student ability to setup job order register	8	8								
2. Ability to determine proper classification	8	8								
3. Using correct marking symbols	5	5								
4. Care of equipment and tools (DA Form 2404)	2	2								
5. Students regard for safety	4	4								

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CW-F-2 DS

RAW SCORE CONVERSION CHART

RAW SCORE	PERCENT	RAW SCORE	PERCENT
165	10000	142	08606
164	09939	141	08546
163	09879	140	08485
162	09818	139	08424
161	09758	138	08364
160	09697	137	08303
159	09636	136	08242
158	09576	135	08182
157	09515	134	08121
156	09455	133	08061
155	09394	132	08000
154	09333	131	07939
153	09273	130	07879
152	09212	129	07818
151	09152	128	07758
150	09091	127	07697
149	09030	126	07636
148	08970	125	07576
147	08909	124	07515
146	08849	123	07455
145	08788	122	07394
144	08727	121	07333
143	08667		

CW-F-2 DS

RAW SCORE CONVERSION CHART

RAW SCORE	PERCENT	RAW SCORE	PERCENT
120	07273	98	05939
119	07212	97	05879
118	07152	96	05818
117	07091	95	05758
116	07030	94	05697
115	06970	93	05636
114	06909	92	05576
113	06849	91	05515
112	06788	90	05455
111	06727	89	05394
110	06667	88	05333
109	06606	87	05273
108	06546	86	05212
107	06485	85	05152
106	06424	84	05091
105	06364	83	05030
104	06303	82	04970
103	06242		
102	06182		
101	06121		
100	06061		
99	06000		

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U. S. ARMY QUARTERMASTER SCHOOL

Grade Sheet
for
CANVAS AND WEBBED REPAIR SHOP OPERATION AND EXAMINATION

STUDENTS' EXAMINATION OBJECTIVE: Demonstrate ability to set up and operate a canvas and webbed repair shop.

DIRECTIONS:

1. Materials Required:

    a. Deviation Sheet (CW-F-2 DS).

    b. Examination Record Sheet (TRADOC Form 533 R). BLUE COLOR

    c. Heavy duty sewing machines.

    d. Medium duty sewing machines.

    e. Light duty sewing machines.

    f. Various weights of canvas materials.

    g. Cleaning materials.

    h. Lubricants.

    i. Needle and thread chart.

    j. Tool kit.

    k. Special tools.

    l. DA Form 2407.

    m. DA Form 2405.

    n. DA Form 2404, attached to machine.

2. Examination Tasks:

    a. Construct the water shed patch (felled).

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DECEMBER 1974

b. Construct the near seam patch (top ply).

c. Set up the job order register.

d. Use marking symbols.

e. Perform maintenance on equipment.

3. Scoring Procedures:

a. Use Deviation Rating Sheet (CW-F-2 DS) to determine the student's performance on each item.

b. Enter each student's name at the top of each column.

c. Under each student's name, record the points earned next to each performance item.

d. Total the points earned and enter the total in the column at the end of the grade sheet.

4. Critique: Identify those areas where points were deducted. Explain corrective measures.

5. Recording Procedures:

a. Sign student's progression sheet.

b. Enter the score and examination time on the instructor's master progression chart.

c. Fill out an EXAM RECORD sheet (TRADOC Form 533-R) for each student. Duplicate all alphabetic codes and numerals shown on the accompanying sample. These are standardized for this particular examination. To find the percentage score, locate the raw score on the RAW SCORE CONVERSION CHART accompanying the deviation sheet (CW-F-2 DS). NOTE: 100% = 10000. To incorrectly enter this as 01000 would credit the student with only 10%. For every percentage score except 100%, the first digit will be a 0. EVERY ZERO SHOULD HAVE A SLASH THROUGH IT.

d. Turn all EXAM RECORD sheets into your section supervisor for processing by student accounting.

e. File the grade sheet in the class record file for future reference checks within the Branch.

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CW-F-2 GS

PERFORMANCE EXAMINATION (Grading Sheet)

CANVAS AND WEBBED EQUIPAGE REPAIR COURSE

SHOP OPERATIONS

NAME OF STUDENT

MAXIMUM POSSIBLE SCORE 165 MINIMUM PASSING SCORE 115	VALUE									
A. WATERSHED PATCH FELLED	X	X	X	X	X	X	X	X	X	X
1. Roof of patch 22½ degree angle	3									
2. Patch parallel with repaired item	1									
3. Patch folded square	1									
4. Fold of patch 3/4" under	3									
5. Corners do not protrude (5)	5									
6. Folded (Bottom 1st, Side 2nd, Top 3rd)	5									
7. First stitch row 1/8" from edge	3									
8. Tacked 1" (2) each	6									
9. Tacked in same stitch row	8									
10. Patch corners secured (5)	5									
11. Machine tension adjusted correctly.	4									
12. 5 to 7 stitches per inch	2									
13. Stitch line straight	6									
14. Damage turned under 1/2"	5									
15. Corners of damage area secured (5)	5									
16. Stitch line 1/8" from edge on damage	3									

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NAME OF STUDENT

MAXIMUM POSSIBLE SCORE 165 MINIMUM PASSING SCORE 115	VALUE										
B. NEAR SEAM PATCH TOP PLY	X	X	X	X	X	X	X	X	X	X	X
1. Roof of patch 22½ degree angle	3										
2. Patch squared with Seam	1										
3. Patch folded square	1										
4. Fold of patch 3/4" under	3										
5. Corners do not protrude (2)	2										
6. Folded (Bottom 1st, Side 2nd, Top 3rd)	5										
7. First stitch row 1/8" from patch edge	3										
8. 2nd stitch 1/8" to 1/2" from 1st	3										
9. Patch inserted into seam 3/4"	4										
10. Finish with two stitch rows (matching Seams)	3										
11. Tacked 1 inch over seam	8										
12. Tacked same stitch row (4)	12										
13. Patch corners secure	4										
14. Tension adjusted correctly	4										
15. 5 to 7 stitches per inch	2										
16. Stitch lines straight	12										
17. Damage trimmed 1/8" from stitch row	3										

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CW-F-2 GS

NAME OF STUDENT

MAXIMUM POSSIBLE SCORE 165 MINIMUM PASSING SCORE 115	VALUE									
C. GENERAL	X	X	X	X	X	X	X	X	X	X
1. Student ability to setup job order register	8									
2. Ability to determine proper classification	8									
3. Using correct marking symbols	5									
4. Care of equipment and tools (DA Form 2404)	2									
5. Students regard for safety	4									
TOTAL	165									

QMS 244.1WB-1

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STUDENT WORKBOOK

FABRIC REPAIR COURSE

43M10

PART III

U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

SUPPLY TRAINING CENTER OF THE ARMY SCHOOL SYSTEM
PROPONENT DEPARTMENT: Petroleum and Field Services
MARCH 1976
This Workbook supersedes QMS 244.W1 dated March 1973

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SECTION I

INTRODUCTION

1-1. PURPOSE. This workbook is intended as a guide and handy reference for the student who has successfully completed the basic instruction in the course for the canvas repairman, MOS 43M20. The workbook is designed to help the student become proficient in the repair of all types of canvas and webbed items so that he can perform his duties satisfactorily in an activity or support unit. The instructions contained in the workbook prescribe the materials, procedures, and standards required for the repair of canvas and webbed items. Illustrations are provided for the identification of items and clarification of repair procedures.

1-2. WORKMANSHIP. All operations on canvas and webbed items are to be performed by men at MOS skill level 43M20 or higher. Holes, rips, or tears in items that require patching or darning should be repaired according to the military specifications for the items. Patches are to be tightly sewn, and stitching must be free of loose or broken thread. Hardware must be clean, free from rust and corrosion, and securely and properly attached. Ropes must be serviceable, complete, and of the proper dimensions. Splices in ropes are to be neat, of the proper dimensions, and made in a skillful or workmanlike manner. Repaired items must be complete in every detail, clean, well repaired, and free from defects that affect serviceability, operation, or general appearance.

1-3. REPAIR MATERIALS. Materials used for repair of canvas and webbed items must be serviceable materials. They should be materials recovered from like salvaged items when recovery is authorized by the area commander, or they should be new materials requisitioned through regular supply channels. Repair materials must match the type, color, size, and other characteristics of the materials used in the original construction. The materials are listed in technical manuals, technical bulletins, or repair parts manuals, applicable to specific items.

1-4. INSPECTION, CLEANING, CLASSIFICATION, AND REPAIR. An inspector should carefully examine items to be repaired to identify them and should then classify them individually according to the standards prescribed in current regulations. Before repair, each item is inspected to decide on the necessary repairs. Items must be repaired to a serviceable condition consistent with requirements set forth in the classification standards. The repair methods described in this text are to be observed as fully as skills, facilities, funds, and local conditions permit. The repairing organization should decide the sequence of repair procedures unless the area commander prescribes otherwise.

a. Preliminary inspection and cleaning. Before items are repaired, they must be inspected by a qualified inspector to determine the amount of cleaning, replacement, repair, and retreating, necessary to bring the items to a serviceable condition. Unless otherwise indicated in this workbook, clean and inspect items as follows: Remove dirt, dust, mud, mildew, rust and other foreign material with a brush or broom or with a damp or dry cloth. If the item is exceedingly dirty, wash it with limited amounts of water, rinse it off, and dry it. Systematically inspect textile components for holes, cuts, tears, broken or missing stitching, loosely woven material, and frayed or scalloped edges. Test questionable areas for weakness by applying pressure on the areas and by attempting to tear the material. Mark mildewed and rotten areas of tents with a crayon, and test these areas for weakness by placing the thumb on the area in question and applying pressure, or by pinching the cloth and attempting to tear against the warp. Test the seams of tents by grasping one panel in each hand and pulling at right angles to the seam. Inspect hardware for loss or misplacement and for any bent or broken parts, corroded areas, burs, sharp edges, malfunctions, and partially or totally omitted metal finish. Mark all areas where repairs are needed.

b. Final inspection. After repairs are completed, each item must be inspected by a qualified inspector, for workmanship, quality control, and reclamation. The inspector must insure that a serviceable item meets the classification standards prescribed for it in current regulations. The inspector is responsible for verifying that all phases of repair are in compliance with the standards so that no substandard item is returned to the supply system.

SECTION II

BASKETS AND FRAMES

2-1. DESCRIPTION. Two types of baskets of the kind commonly called laundry baskets are described in this section. All baskets of this kind are similar in construction; therefore, if the canvas repairman knows how to repair and maintain the two types described, he should have no trouble in repairing others similar to these two.

a. Basket with removable liner. This basket (fig. 2-1) has a frame with a removable body, or canvas liner, both of which may be mounted on hardwood skids, caster boards, or steel bottoms. This assembly is constructed primarily of natural-color canvas, spring-steel wire, and hardwood. The canvas liner forming the basket is placed over the steel frame, which is mounted on the appropriate foundation. The 8-bushel basket is about 36 inches long, 24 inches wide, and 20 inches deep. This assembly is also made in 10-, 12-, 14-, and 16-bushel sizes. Though there may be slight differences in the frames, liners, and skids, construction of these baskets is essentially similar.

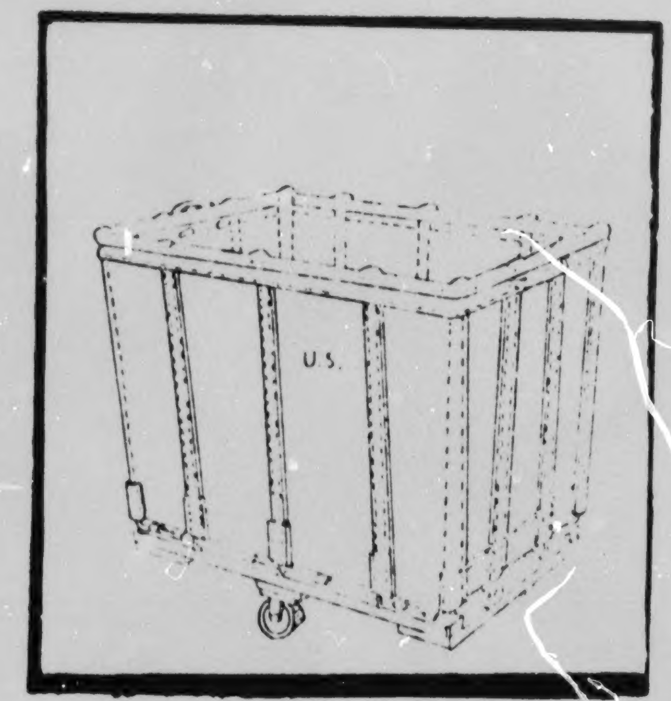

Figure 2-1. Basket with removable liner.

b. Basket with nonremovable liner. This basket (fig. 2-2) has an olive-drab, nonremovable canvas liner with carrying handles, and is caster mounted. The 16-bushel basket is about 42 inches long, 30 inches wide, and 28 inches deep; and the 18-bushel basket is 42 inches long, 30 inches wide, and 30 inches deep.

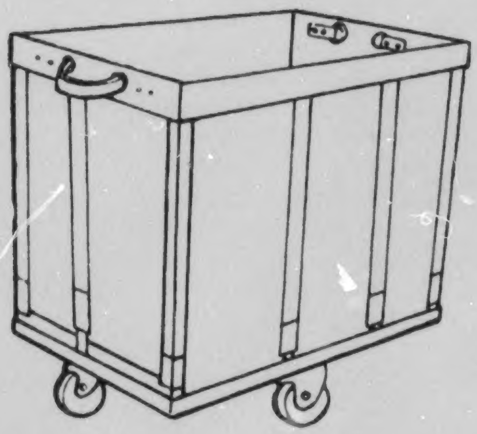

Figure 2-2. Basket with nonremovable liner.

2-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, thread, sash cord, grommets, rivets, spring-steel rods (liner stiffeners), sheet or strip steel, lumber, and casters.

2-3. **REPAIR METHODS.** Before making repairs to canvas and webbed items, the canvas repairman should develop a systematic method of making the repairs and should stick to this procedure throughout the repair process. Usually, his repairs are confined to replacing, patching, or repairing canvas and webbed components and to straightening or replacing hardware components. Procedures for repairing baskets are described below.

a. Preliminary inspection. See paragraph 1-4a. Clean all rusted or corroded basket frames by buffing, brushing, or scraping or by applying a drycleaning solvent, full strength. Launder the liners in water at a constant temperature not exceeding 100° F. Wash nonremovable-type liners with laundry soap and a brush, and rinse thoroughly.

b. Repair. Repairs to frames, skids, battens, liners, and casters are made as required, and the completed job is appropriately repainted and remarked, if necessary.

(1) Frames, skids, and battens. Replace missing, broken, or otherwise defective skids or battens with components fabricated from hardwood. Remove all splinters or slivers from wood by sanding or planing, and insure that the size and design of the replacement conform to those of the item being replaced. Straighten or weld bent or broken frame members, making welds sound and smooth. Replace broken metal members that cannot be repaired, with the same type as that removed.

(2) Removable liners. Darn holes and tears less than one-half inch in diameter by placing a piece of duck on the underside and making a zig-zag stitch through both edges, trimming the piece as close to the liner as possible. Patch holes or tears larger than one-half inch. Make patches of sufficient size to allow a 1-inch margin on four sides of the hole, with all edges turned under one-quarter inch. Finish patches on both sides so that no raw edges will show and so that the patch is sewn on with two rows of parallel stitching spaced one-eighth inch apart. Do not place more than four patches on either side or bottom area of the liner, and do not sew more than three patches on either end. Insure that all patches or darns are on the outside of the liner when it is in the use position. Machine sew all stitching (except overedge stitching) with a type 301 lockstitch (fig. 2-3), using six stitches per inch. When a line of stitching is not a continuous thread, backstitch (tack) it at least 1 inch to prevent raveling. Maintain proper thread tension on the machine so that the stitch lock is imbedded

in the center of the material sewn. Overlay all raw edges on the body of the liner or on patches. Machine sew overedge stitching 12 stitches per inch. Replace all defective or missing grommets for the lacing sashcord with No. 2 grommets by first sewing canvas patches on both sides of the material and then installing the grommet in the proper position.

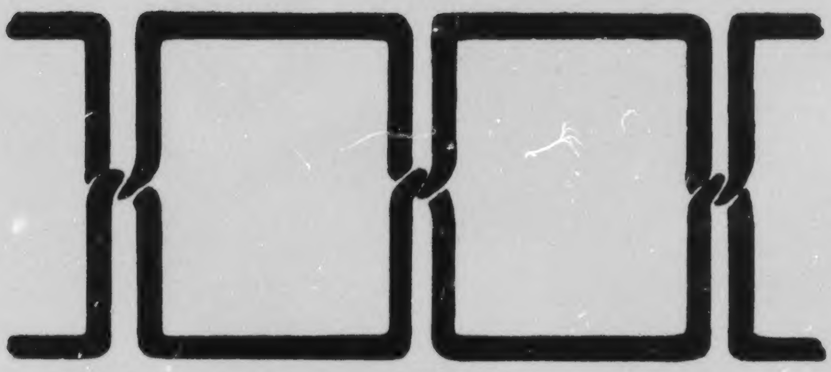

Figure 2-3. Type 301 lockstitch.

(3) Nonremovable liners. Observe the same limitations on the size of patches, darning, and sewing used for the removable liner ((2) above), but patch and darn the nonremovable liner by hand, locking every fourth stitch. Repair frayed or damaged areas along the tunnel containing the top rail by patching or replacing it with olive-drab, No. 4, cotton duck cloth. Patch or replace leather reinforcement with olive-drab cotton duck cloth. Cut canvas

reinforcement 3 inches wide and the required length, fold it under one-half inch on each side, center it on top of the basket, and sew or rivet it in place. Fabricate replacement handles from the same duck as the reinforcement by cutting a piece 4 inches by 16 inches and folding in the raw edges one-half inch to make a finished handle 1 1/4 by 15 inches. Thread the ends of the handle through the holes in the liner so that the loop of the handle is on the outside of the basket, with about 2 inches of the ends protruding inside. Fold the 2-inch portion of the handle around the top rail and rivet it down upon itself with tubular-brass, bronze-finished rivets on each end.

(4) Casters. Replace missing, broken, or otherwise defective casters that cannot be repaired.

(5) Surface finishes. After cleaning metal and wood parts, refinish basket frames that have a defective finish with one coat of aluminum paint.

(6) Markings. Restencil a faded "U.S." marking, with waterproof ink or stencil paint. Obliterate other markings with waterproof ink or stencil paint.

c. Final inspection. See paragraph 1-4b.

SECTION III

INDIVIDUAL LOAD-CARRYING EQUIPMENT

3-1. GENERAL. Many items accompanying troops in the field can be grouped together and classified as individual load-carrying equipment. Such items generally have eyelets, snap fasteners, and other fastening devices used to attach one item of load carrying equipment to another. Because individual load-carrying equipment is frequently used in some units to help the individual support various loads on his person, it is subject to much wear and tear and frequent need of repair. Individual load-carrying equipment includes the individual equipment belt, the intrenching-tool carrier, and sleeping bags, etc.

3-2. INDIVIDUAL EQUIPMENT BELT. This belt (fig. 3-1) is issued in two models; one is made from olive-drab, Army shade 7, mildew-resistant, water-repellent cotton webbing, and the other is made from olive-drab, Army shade 7 nylon webbing. The two models are similar in appearance and design. Each belt is provided with a brass hook-type buckle fastener that has a black chemical finish. Eyelets along the bottom of the belt and interlocking sliding keepers on the belt are used to attach loads. Eyelets at the top of the belt are used for attaching the field-pack suspenders. The belt comes in two sizes, large and medium. The large belt has an adjustable length ranging from about 33 to 55 inches; the medium belt is adjusted from about 26 to 43 inches. The same methods are used for repairing both the nylon and cotton webbing belts.

a. Repair materials. Hardware items are the only components of the belt that may be repaired; if the webbing is damaged, the belt is discarded and a new belt issued. The following hardware items should be in accordance with paragraph 1-3: eyelets, sliding keepers, end clips, and male and female buckle fasteners.

b. Repair methods. Procedures for inspecting, cleaning, repairing, and replacing components of the equipment belt are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching, darning, and patching. Do not attempt any stitching, darning, or patching of the belt. Rather than attempting such repairs, which are impractical, issue a new belt.

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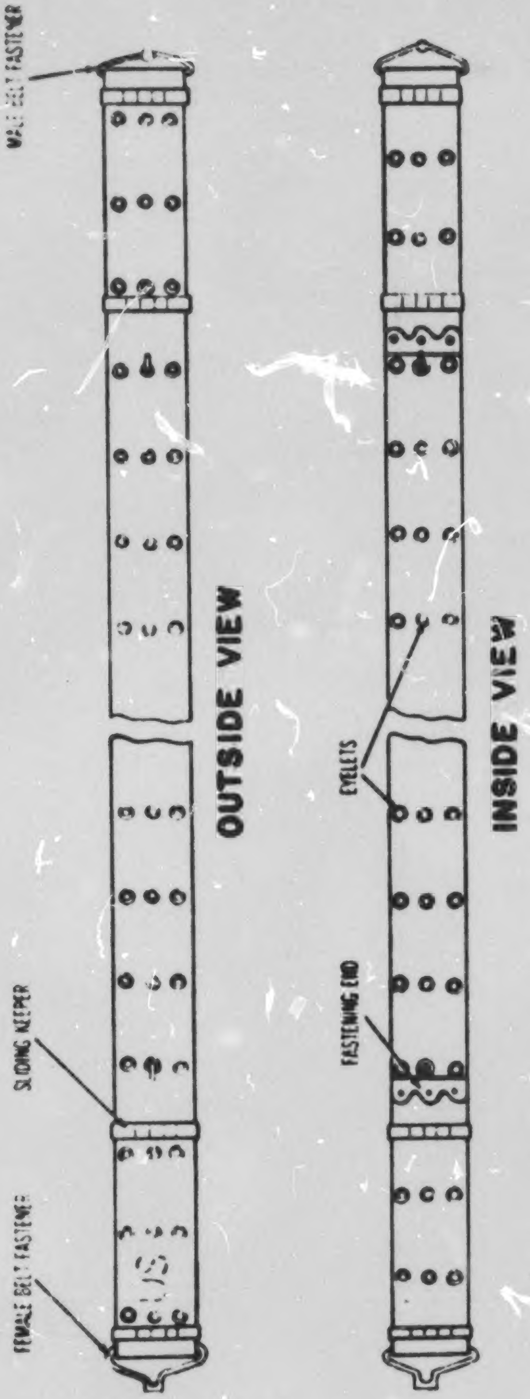
MALE BELT FASTENER
OUTSIDE VIEW
INSIDE VIEW
EYELETS
FASTENING END
SLIDING KEEPER
FEMALE BELT FASTENER
US

Figure 3-1. Individual equipment belt.

(3) Repairing and replacing hardware. Straighten bent hardware, or replace missing, damaged, or unserviceable hardware with the appropriate items. Remove rust or corrosion from serviceable hardware with a soft wire brush. Test to insure that the repaired or replaced hardware operates as intended.

c. Marking. Obliterated or partially obliterated "U.S." marking and size marking on a belt are re-marked as close to the location of the original marks as possible. Black, opaque stencil ink is used for marking porous surfaces.

d. Final inspection. See paragraph 1-4b.

3-3. M-1956 INTRENCHING-TOOL CARRIER. The M-1956 intrenching-tool carrier (fig. 3-2) is issued in two models; one is made from olive-drab, cotton duck cloth and textile webbing, and the other is made from olive-green, nylon duck cloth and textile webbing. The body of the carrier is reinforced with leather on the front, back, and sides. The back of the carrier is equipped with two keepers, each containing a slide for attaching the carrier to the individual equipment belt. On the front of the carrier is a hanger for holding a bayonet or bayonet knife scabbard. Overall dimensions of the carrier, with flap open and extended, are about 14 1/2 inches long by 8 inches wide. Except for patching, which is allowed on the nylon model only, repairs of the two models are similar.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: tape, webbing, thread, leather, keepers with slides, eyelets and washers, snap fasteners, and tubular rivets with caps.

b. Repair methods. Procedures for inspecting, cleaning, and repairing, and replacing components of the intrenching-tool carrier are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Except for emergency repair of the item, use machine stitching for all sewing of the intrenching-tool carrier. For other than overedge stitching, use a machine that makes the 301 lockstitch, and sew 6 to 8 stitches per inch. For overedge stitching, sew 8 to 12 stitches per inch. Maintain proper thread tension to prevent loose stitches. Backstitch (tack) the stitch line at each end at

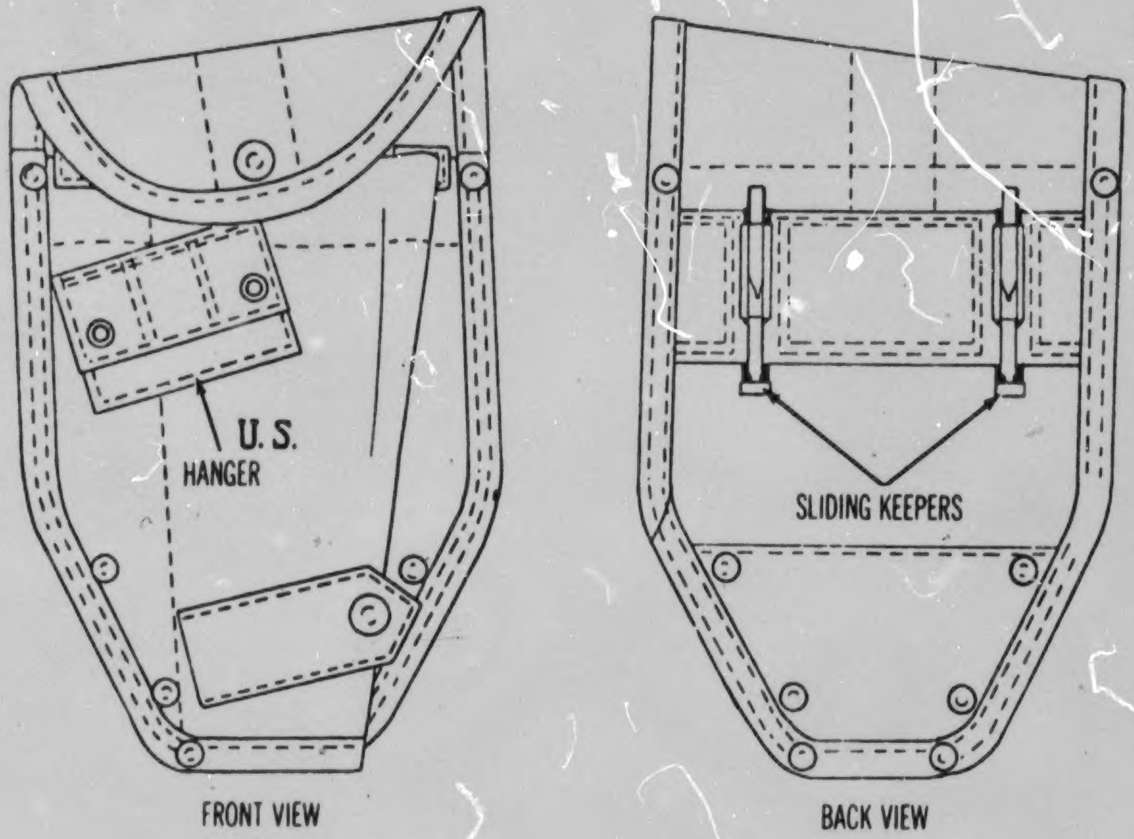
U.S.
HANGER
SLIDING KEEPERS
FRONT VIEW
BACK VIEW

Figure 3-2. M-1956 intrenching-tool carrier.

least seven-eighths of an inch but not more than 1 1/8 inches. Overstitch any thread breaks at least seven-eighths of an inch at either end except where ends are held down by other stitching.

(3) Darning. Darn small holes or tears not exceeding one-half inch in length. When necessary, place a piece of like material on the underside, and sew with a zig-zag stitch.

(4) Patching. Patching of the intrenching-tool carrier is limited to the nylon model. Patch holes and tears that exceed 1 inch in length or diameter with a single patch. Cut the patch of sufficient size to extend 1 inch beyond the hole on all sides plus a 3/8-inch turnunder of raw edges. Place the patch on the outside, and sew one-eighth inch from the edge. There is no limit to the number of times the item may be patched.

(5) Replacing webbing. Remove defective webbing by carefully cutting the attaching stitches, without damaging the material. Cut the replacement material to the size and contour of the original, and sew it in the position of the original.

(6) Replacing tape. Carefully remove defective tape to avoid damaging the adjacent material. Cut the replacement tape long enough to provide a 1/4-inch turnunder and a minimum 1/2-inch overlap on old tape at each end. Start and end the stitching at least one-half inch in front of and beyond the replacement tape.

(7) Repairing and replacing hardware. Adapt procedures in paragraph 3-2b(3).

(8) Replacing leather. Replace damaged or defective leather under the eyelets on the front of the intrenching-tool carrier with a piece of matching leather. Carefully cut the stitching on the back of the tape; then remove the old leather, and cut a new piece the same size and shape. Sew the new leather in the position of the original, and resew the tape with a double row of stitching.

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

3-4. SLEEPING-BAG CARRYING-STRAP ASSEMBLY. This item (fig. 3-3) is made from olive drab, shade 7, cotton webbing. It contains two attaching straps, 22 3/4 inches long by 1 inch wide with snap fasteners; one cross strap, 8 inches long by 1 inch wide, with cross-strap handle, 8 inches long by 2 inches wide; two retaining straps, 20 inches long by five-eighths inch wide, with snap fasteners; and two securing straps, 44 1/2 inches long by 1 inch wide, with a single-bar buckle fastener.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: webbing, thread, single-bar buckles with lips, end clips, and snap fasteners.

b. Repair methods. Procedures for inspecting, cleaning, and repairing, and replacing components of the carrying-strap assembly are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Follow procedures in paragraph 3-3b(2).

(3) Darning and patching. Do not attempt to darn or to patch the webbing of the carrying-strap assembly; darning and patching are impractical.

(4) Replacing webbing. Replace defective or missing webbing as explained in paragraph 3-3b(5).

(5) Repairing and replacing hardware. Follow procedures in paragraph 3-2b(3).

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

3-5. FIELD, FIRST-AID-DRESSING CASE--UNMOUNTED MAGNETIC COMPASS. The field first-aid-dressing case (fig. 3-4) can be used for carrying first aid dressings in the field or as a pouch for carrying the unmounted magnetic compass. The case is issued in two models; one is made from olive-drab, cotton-duck cloth, and the other is made from olive-green, nylon duck cloth. The cotton-duck case is mildew resistant and water repellent, and the nylon case is water repellent. The case is essentially a pocket or pouch that is attached to the individual equipment belt by an interlocking slide keeper.

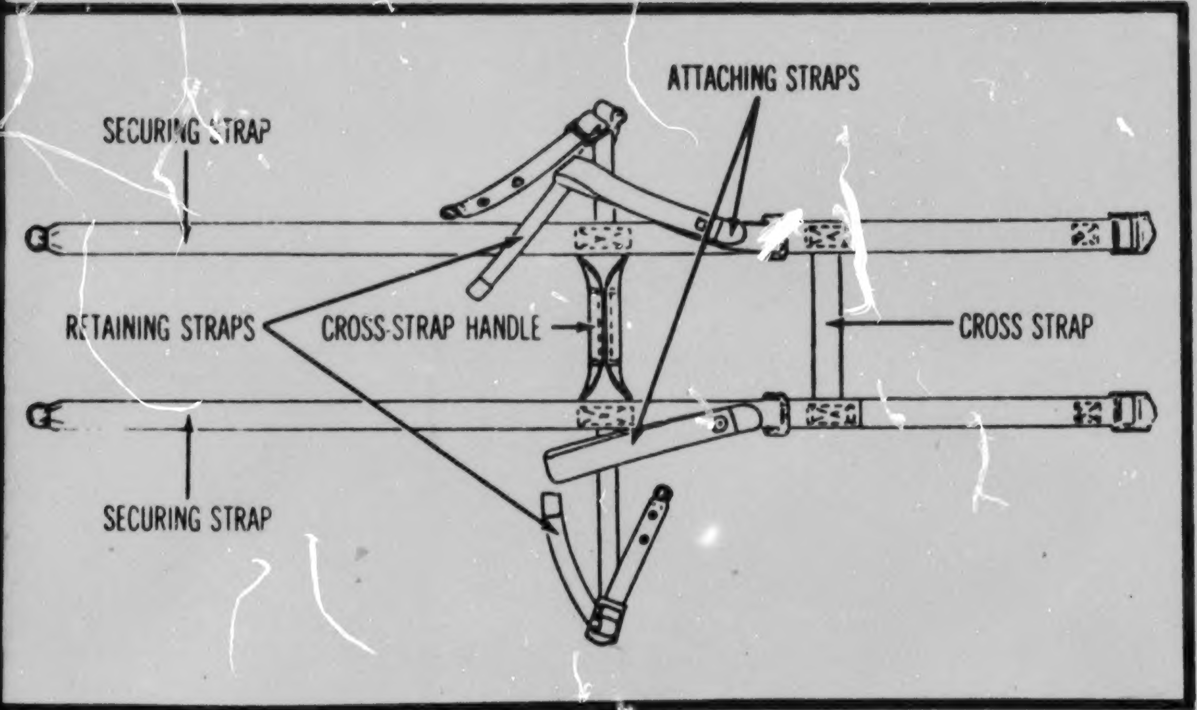
ATTACHING STRAPS
SECURING STRAP
RETAINING STRAPS
CROSS-STRAP HANDLE
CROSS STRAP
SECURING STRAP

Figure 3-3. Sleeping-bag carrying-strap assembly.

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981 The case when opened and with the flap fully extended is 8 1/2 inches long by 4 1/8 inches wide by 4 inches deep. The nylon model is the same length and depth, but is 4 1/2 inches wide. It is closed by a snap fastener.

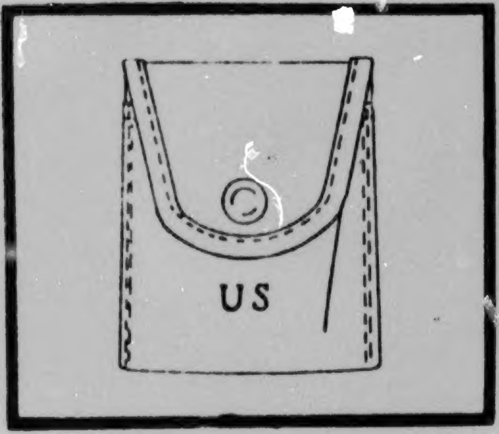

Figure 3-4. Field, first-aid-dressing case or unmounted compass case.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: tape, webbing, thread, keeper with slide, snap fastener, and eyelet and washer.

b. Repair methods. Procedures for inspecting, cleaning, and repairing, and replacing components of the first-aid-dressing case are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Follow procedures in paragraph 3-3b(2) except for overedge stitching, which is not permitted.

(3) Darning and patching. Do not darn or patch the first aid case. Issue a new one if the old one requires darning or patching.

(4) Replacing webbing and tape. Replace defective or missing webbing and binding tape as specified in paragraph 3-3b(5) and (6).

(5) Repairing and replacing hardware. Follow procedures in paragraph 3-2b(3).

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

3-6. WATER-CANTEEN COVER. The water-canteen cover (fig. 3-5) is issued in two models; one is made from olive-drab, cotton duck cloth, and the other is made from olive-green, nylon duck cloth. The cover has an acrylic-pile fabric lining and has two snap fastener assemblies on the body and the cover flaps. Two keepers with slides enable the soldier to attach the cover to the individual equipment belt. The two models are similar in construction.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: cloth, tape, webbing, thread, snap fasteners, and keeper with slide.

b. Repair methods. Procedures for inspecting, cleaning, and repairing, and replacing components of the canteen cover are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Follow procedures in paragraph 3-3b(2).

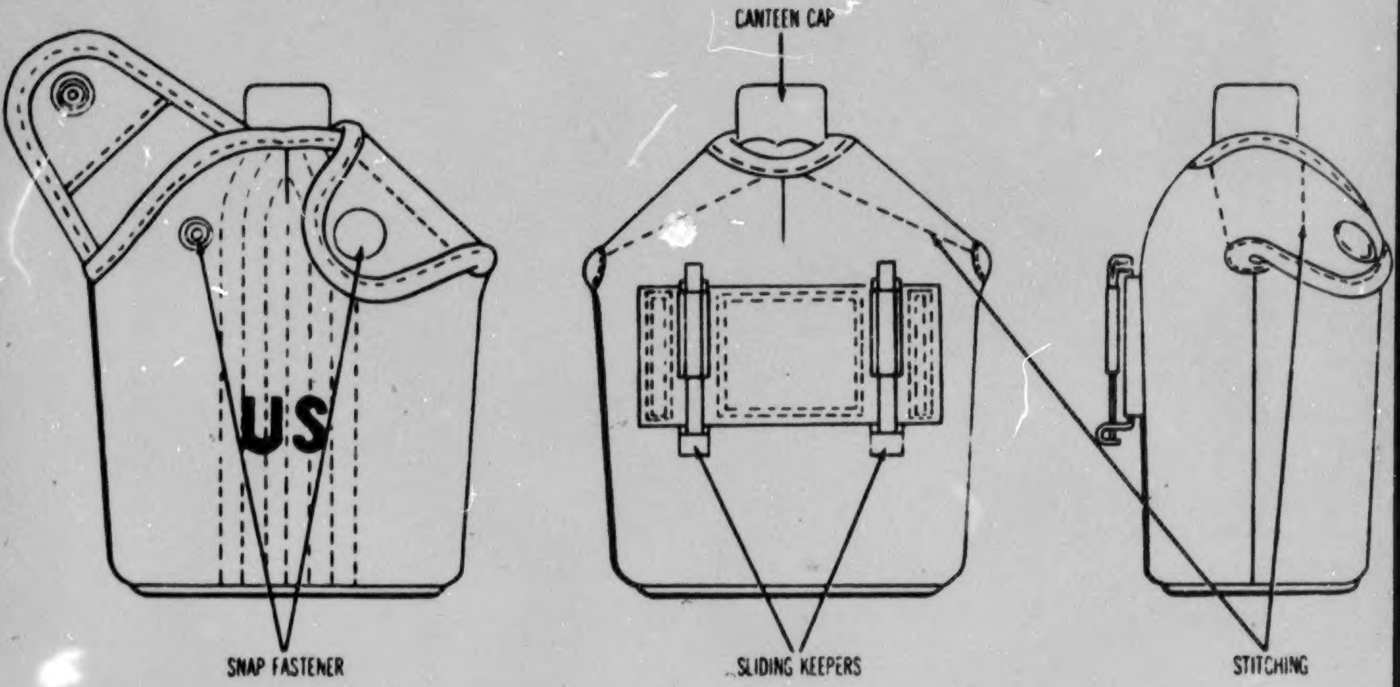
CANTEEN CAP
US
SNAP FASTENER
SLIDING KEEPERS
STITCHING

Figure 3-5. Canteen with cover.

(3) Darning. Darn small holes or tears not exceeding one-half inch in length. If necessary, place a piece of like material on the underside of the cover, and sew with a zig-zag stich.

(4) Patching. Do not patch either the cotton-duck or the nylon models of the canteen cover except to make reinforcements for replacement of snap fasterners that have pulled loose.

(5) Replacing webbing and tape. Replace defective or missing webbing and binding tape as specified in paragraph 3-3b(5) and (6).

(6) Repairing and replacing hardware. Follow procedures in paragraph 3-2b(3).

(7) Replacing bottom. Replace a defective bottom that has a rip or tear larger than 1 inch that cannot be darned. Turn the cover inside out, and carefully cut the stitches attaching the bottom to the body. Cut a new bottom from cotton duck cloth or from plain weave olive-green nylon cloth. If necessary, make a new lining from acrylic-fiber pile cloth cut to the size and shape of the original. If the original lining is serviceable, carefully remove it from the defective bottom and re-use it on the new bottom. First sew the lining to the bottom; then attach both to the cover body with the required thread, sewing 6 to 8 stitches per inch. To replace a defective bottom lining remove the bottom, and replace old liner with the new lining as described above.

c. Marking. Follow procedures in paragraph 3-2c

d. Final Inspection. See paragraph 1-4b.

3-7. FIELD PACK. The field pack (fig. 3-6) is issued in two models; one is made from 14.35 ounce, olivd-drab, cotton duck cloth, and the other is made from olive-green, nylon duck cloth. The pack has a flap-type closure with straps and buckles and has a carrying strap. The pack has a waterproof throat at the top and an expandable flap that is secured by two webbed straps with buckles. Two webbed straps on the bottom of the pack are used to attach various additional items outside the pack. An instruction sheet describing the assembly and use of the field pack is carried inside each pack. The pack is equipped with a carrying handle on top of the flap. Dimensions of the cotton model are approximately 10 3/4 inches high by 10 inches wide by 6 inches deep. The nylon model is 9 1/4 inches wide by 10 3/8 inches high by 6 1/8 inches deep. The two models are similar in design and construction.

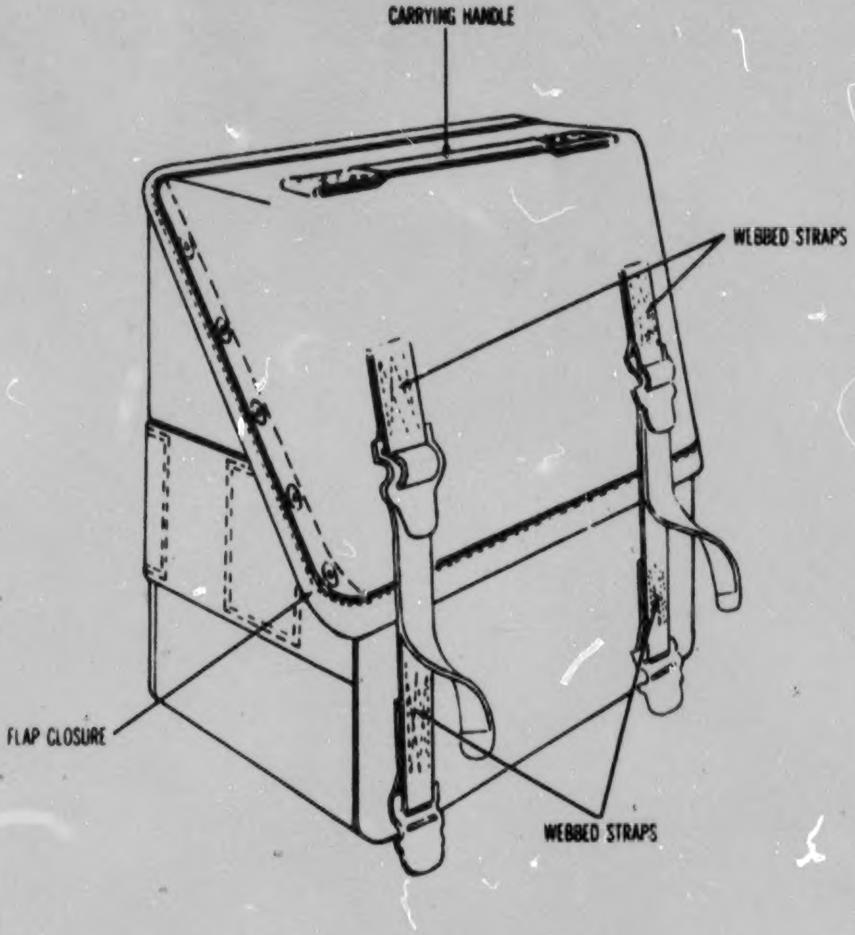
CARRYING HANDLE
WEBBED STRAPS
FLAP CLOSURE
WEBBED STRAPS

Figure 3-6. Field pack.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: cloth, tape, webbing, thread, polyethyline film (for identification holder), buckles, keepers with slides, clip ends, and eyelets and washers.

b. Repair methods. Procedures for inspecting, cleaning, repairing, and replacing components of the pack are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Follow procedures in paragraph 3-3b(2).

(3) Darning and patching. Follow procedures in paragraph 3-3b(3) and (4). Patching is confined to the nylon model.

(4) Replacing webbing and tape. Replace defective or missing webbing and binding tape as specified in paragraph 3-3b(5) and (6).

(5) Replacing film. Replace worn or defective film in the identification holder by carefully cutting the attaching stitches, removing old film, and cutting new film to same size. Place the film in the position of the old film, and resew the 1-inch nylon tape binding.

(6) Repairing or replacing hardware. Follow procedures in paragraph 3-2b(3).

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

3-8. SMALL ARMS AMMUNITION CASE. The small arms ammunition case (fig. 3-7) is intended to carry any of the basic loads of ammunition. The case is issued in two models; one is made from olive-drab, cotton duck cloth and webbing, and the other is made from olive-green, nylon duck cloth and webbing. Plastic stiffeners are provided in the back of the case so that clips of ammunition can be easily inserted and removed. Each side of the case has a grenade retaining strap for carrying handgrenades. The case is attached to the individual equipment belt by two slide-lock keepers and to the field-pack suspenders by a support strap with a snap hook. A large flap at the top of the case is used to close the case. The flap is equipped with a male and female metal loop-type closure. The two models are similar in design and construction.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: nylon cloth, tape, webbing, thread, keepers with slides, clip ends, eyelets and washers, pouch fasteners, snap fasteners, keeper clamps, loop eye snaps, rivets and burs (flat washers).

b. Repair methods. Procedures for inspecting, cleaning, repairing, and replacing components of the case are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

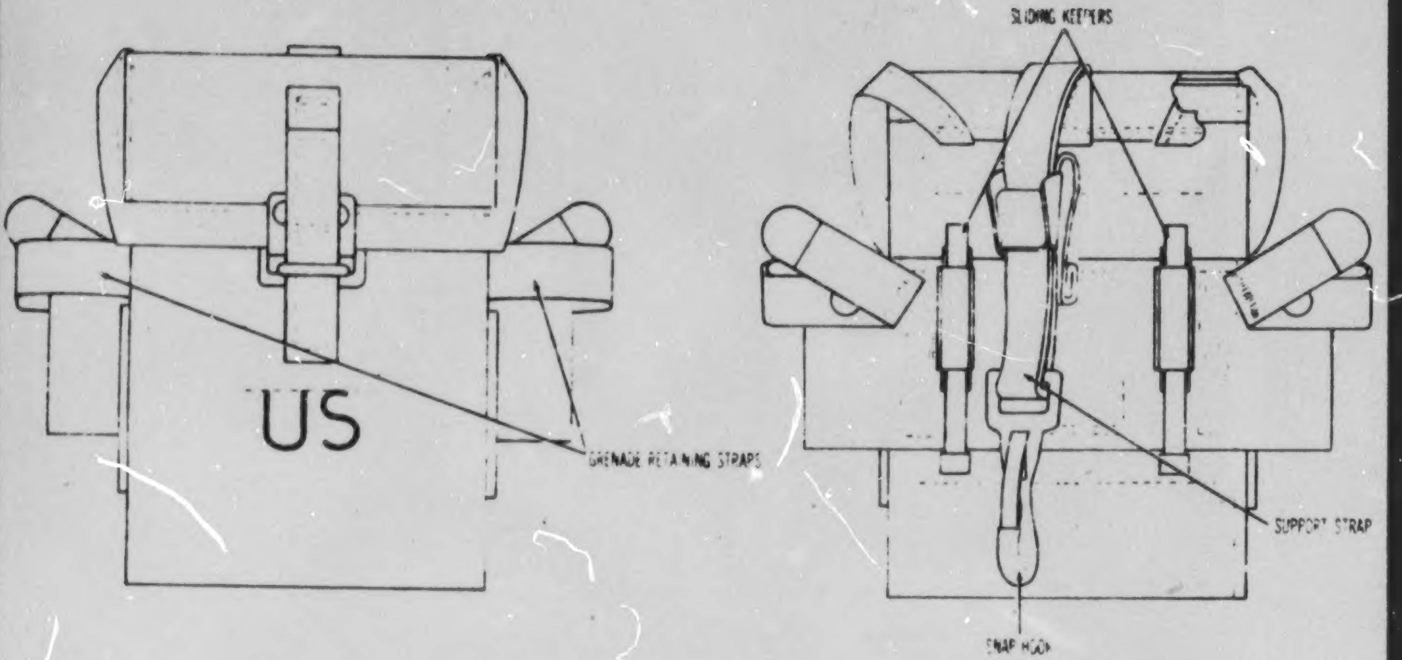
SLIDING KEEPERS
US
GRENADE RETAINING STRAPS
SUPPORT STRAP
SNAP HOOK

Figure 3-7. Small arms ammunition case.

(2) Stitching. Follow procedures in paragraph 3-3b(2).

(3) Darning and patching. Follow procedures in paragraph 3-3b(3) and (4). Patching is confined to the nylon model.

(4) Replacing webbing and tape. Replace defective or missing webbing and binding tape as specified in paragraph 3-3b(5) and (6).

(5) Repairing or replacing hardware. Follow procedures in paragraph 3-2b(3).

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

3-9. M-1956, COMBAT, FIELD-PACK SUSPENDERS. The field-pack suspenders (fig. 3-8) and the individual equipment belt are the two basic pieces of individual load-carrying equipment because other items are suspended from or attached to them. The suspenders are issued in two models; one is made from olive-drab, cotton webbing and drill cloth, and the other is made from olive-green, nylon webbing and duck cloth. Both are equipped with 2 3/4-inch-wide shoulder straps and 1-inch-wide extension straps. The two models are similar in design and construction.

a. Repair materials. The following materials should be in accordance with paragraph 1-3: cloth, webbing, thread, eyelets, snaphooks with clips, end clips, end fastenings, clamp keepers, and strap loops.

b. Repair methods. Procedures for inspecting, cleaning, and repairing, and replacing components of the suspenders are described below.

(1) Preliminary inspection and cleaning. See paragraph 1-4a.

(2) Stitching. Follow procedures in paragraph 3-3b(2).

(3) Darning. Do not darn the suspenders; darning is impractical.

(4) Patching. Follow procedures in paragraph 3-3b(4). Patch either the nylon or the cotton model. Replace a defective or torn shoulder-pad cover

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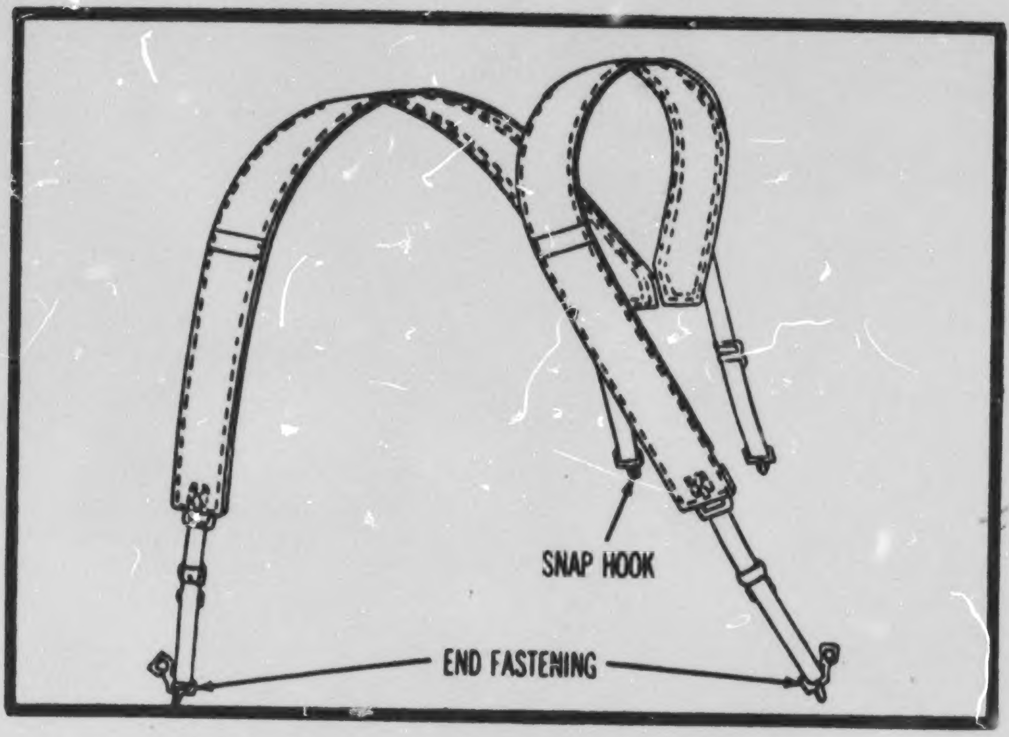

Figure 3-8. M-1956 field-pack suspenders.

with a new cover fabricated from cotton or nylon duck, as appropriate. If the padding is torn, hard, or lumpy, replace it according to the original material and construction. To install new padding, first sew the cover to the spacer cloth, and then sew the shoulder pad to the webbing.

(5) Replacing webbing. Replace missing or defective webbing as specified in paragraph 3-3b(5).

(6) Repairing and replacing hardware. Follow procedures in paragraph 3-2b(3).

c. Marking. Follow procedures in paragraph 3-2c.

d. Final inspection. See paragraph 1-4b.

NOTE: ORIGINAL PAGE 377 HAS BEEN OMITTED; HOWEVER ALL MATERIAL HAS BEEN INCLUDED.

SECTION IV

RUCKSACK

4-1. DESCRIPTION. The rucksack (fig. 4-1) is an individual load-carrying device constructed to carry individual clothing, equipment, and rations. It is an assembly consisting essentially of a lightweight, tubular, aluminum-alloy frame (fig. 4-2), straps, a combat pack, a rifle carrier, and a camouflage cover. The frame holds the load off the wearer's back and allows air to circulate between the wearer's clothes and the load. It has a series of strap retainers, clips, a rifle-strap bracket, and a detachable, cargo support shelf. The straps are constructed of olive-green, nylon textile webbing and are used in securing the load. The combat pack is constructed from olive green, water-repellent nylon webbing, and has four pockets with an adjustable waistbelt. In addition, it has a rifle carrier consisting of a rifle-butt pocket constructed from 1 3/4-inch nylon webbing with double hook and a rifle strap. The camouflage cover completes the assembly. This cover is constructed from 6 1/2-ounce, white cotton drill cloth and is used to camouflage the rucksack when the wearer is operating in snowy terrain.

4-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, webbing, tape, cord, thread, seine twine (tie strings), slide fasteners, grommets, and buckles.

4-3. REPAIR METHODS. Procedures for inspecting, cleaning, and repairing, and replacing components of the rucksack are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Stitching. Follow procedures in paragraph 3-3b(2).

c. Patching. Patch tears and rips on the rucksack pouch bottom with nylon cloth. (See paragraph 3-3b(4).)

d. Replacing pouch-flap-assembly binding. Replace badly worn or damaged binding on pouch-flap assembly. Carefully open seams and remove the old binding, and sew on new 3/4-inch webbing in accordance with original construction.

e. Replacing billets and chapes. Replace missing or damaged billets and chapes by fabricating them from webbing or leather according to the original construction. Machine sew them in place.

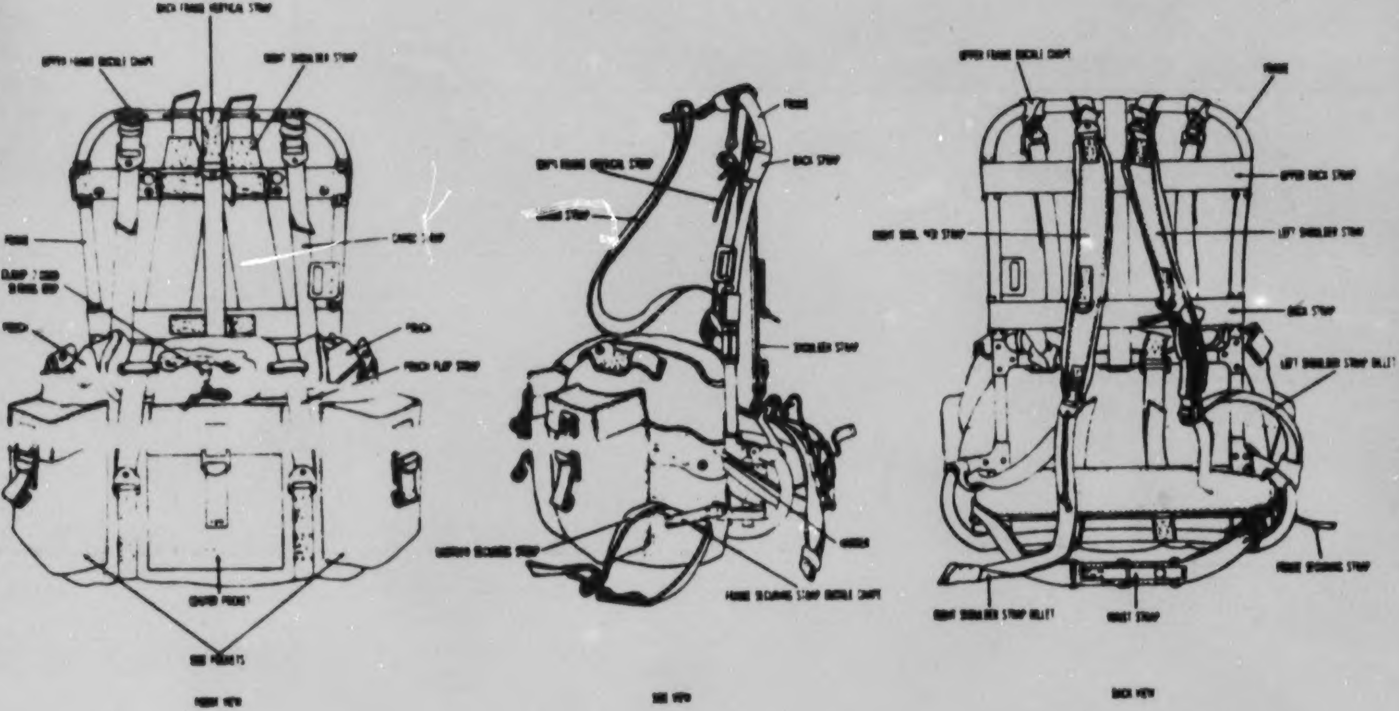
BACK FRAME VERTICAL STRAP
UPPER FRAME BUCKLE CHAPE
RIGHT SHOULDER STRAP
FRAME
CARGO STRAP
POUCH
POUCH
POUCH FLAP STRAP
CARGO POCKET
SIDE POCKETS
FRONT VIEW
FRAME
BACK STRAP
UPPER FRAME VERTICAL STRAP
CARGO STRAP
SHOULDER STRAP
FRAME SECURING STRAP BUCKLE CHAPE
SIDE VIEW
UPPER FRAME BUCKLE CHAPE
FRAME
UPPER BACK STRAP
RIGHT SHOULDER STRAP
LEFT SHOULDER STRAP
BACK STRAP
LEFT SHOULDER STRAP BILLET
FRAME SECURING STRAP
RIGHT SHOULDER STRAP BILLET
WAIST STRAP
BACK VIEW

Figure 4-1. Rucksack.

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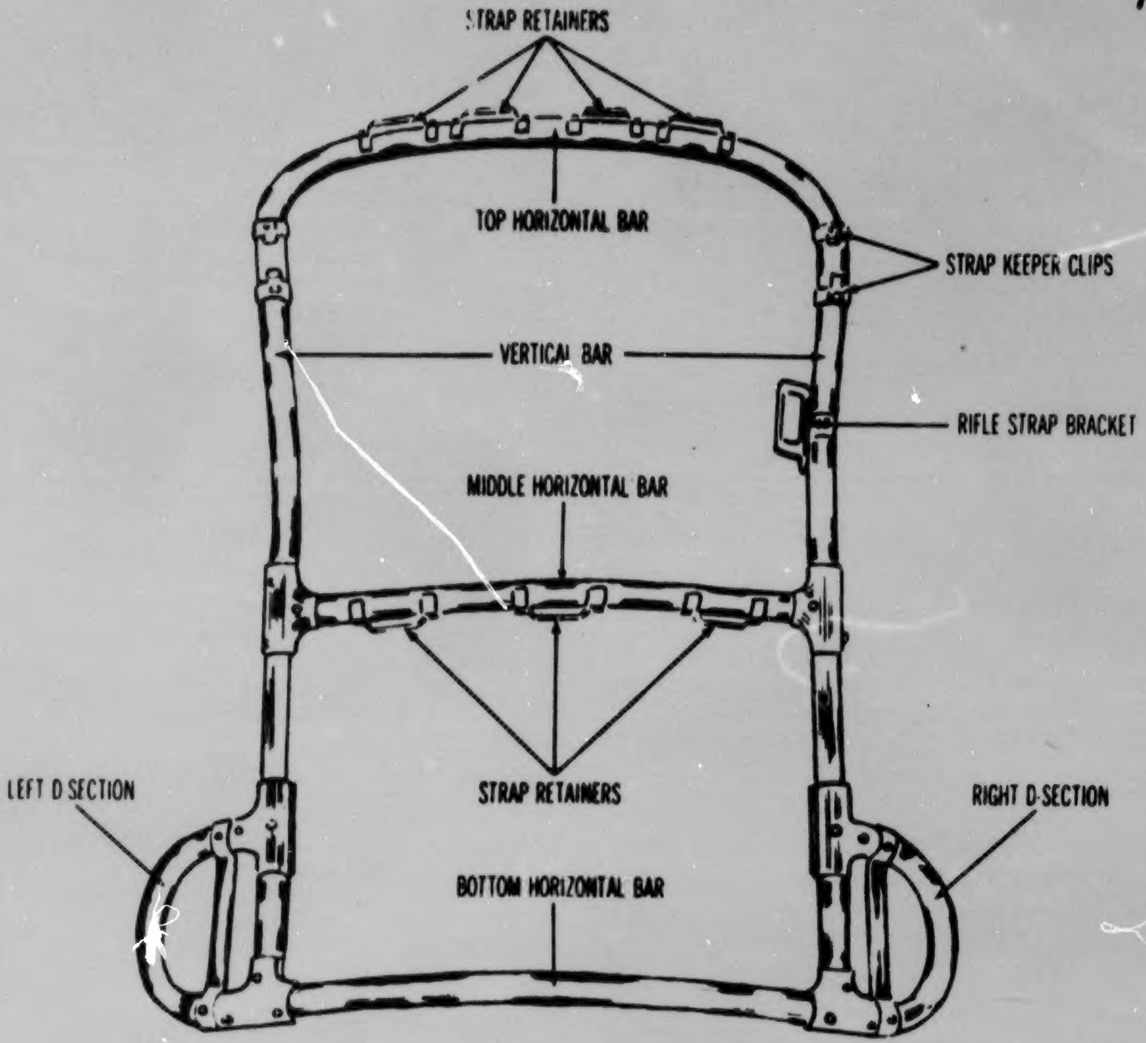
STRAP RETAINERS
TOP HORIZONTAL BAR
STRAP KEEPER CLIPS
VERTICAL BAR
RIFLE STRAP BRACKET
MIDDLE HORIZONTAL BAR
LEFT D SECTION
STRAP RETAINERS
RIGHT D-SECTION
BOTTOM HORIZONTAL BAR

Figure 4-2. Rucksack frame.

f. Replacing straps. Replace damaged or missing shoulder strap and shoulder connecting strap, frame securing strap, pouch reinforcement strap, and rifle securing strap by fabricating new straps.

g. Replacing tabs. Replace damaged or missing tabs by fabricating new ones from appropriate nylon cloth to match the original. Then insert grommets, and sew them in place.

h. Replacing tie strings. Replace missing or damaged tie string on camouflage cover. Cut the tie string 30 inches long, double it, and sew 1 inch of the loop in, with 14 inches hanging free at each end. Tie overhand knots in the ends of the string.

i. Final inspection. See paragraph 1-4b.

SECTION V

CANVAS FOLDING COT

5-1. DESCRIPTION. The canvas folding cot (fig. 5-1) has a canvas cover (fig. 5-2) and a wooden frame. It is made from wood and canvas of one type and size. The cot is of a collapsible design with three pairs of folding legs, one pair at each end and one in the middle. The overall dimensions of the cot are 77 1/2 inches long by 27 inches wide. This cot is intended for field use. There is a cot with nylon cover that is similar in design to the cotton duck cover. Repair methods for the two cots are similar.

5-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, webbing, tape, thread, buckles, and end clips.

5-3. REPAIR METHODS. Procedures for inspecting, cleaning, repairing, and replacing components of the cot are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Replacing covers. Replace covers that have rips, splits, or tears greater than 6 inches in length or holes larger than 1 inch in diameter in the main body of the cover when a single defect or the sum of all the defects exceed the repair limits specified for new covers. These limits are six patches for the entire cover with no more than four to a half section of the cover.

c. Repairing cot cover. Repair holes or tears in a cot cover not needing replacement as specified in b above either by stitching and darning or by patching, depending on the size of the tear. Repair the hole or tear as follows:

(1) Stitching and darning. Repair slight holes or tears in the tubular edge (tunnel for the rails) of the cot cover by darning. When necessary for convenience, cut out the tubular section, make the repair, and resew the tubular section. Reinforce weak corners with a bartack stitch (tackstitch). Resew loose or broken stitches.

(2) Patching. Patch covers with holes 1 inch in diameter that cannot be mended by darning. Trim the damaged area to a square or rectangle of the smallest

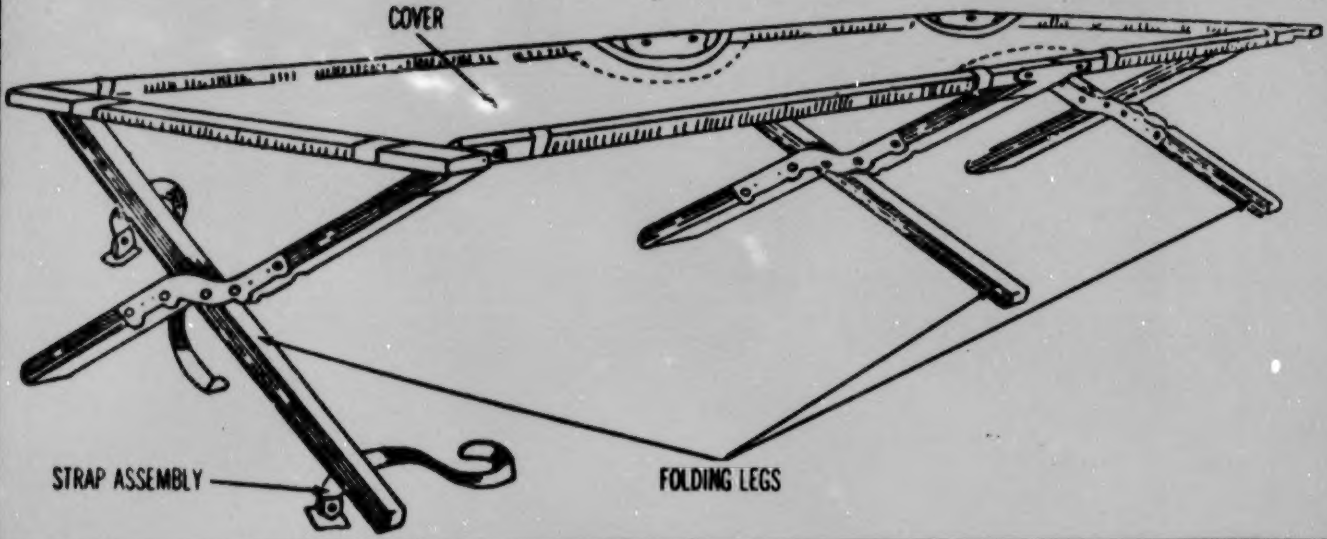
COVER
STRAP ASSEMBLY
FOLDING LEGS

Figure 5-1. Canvas folding cot.

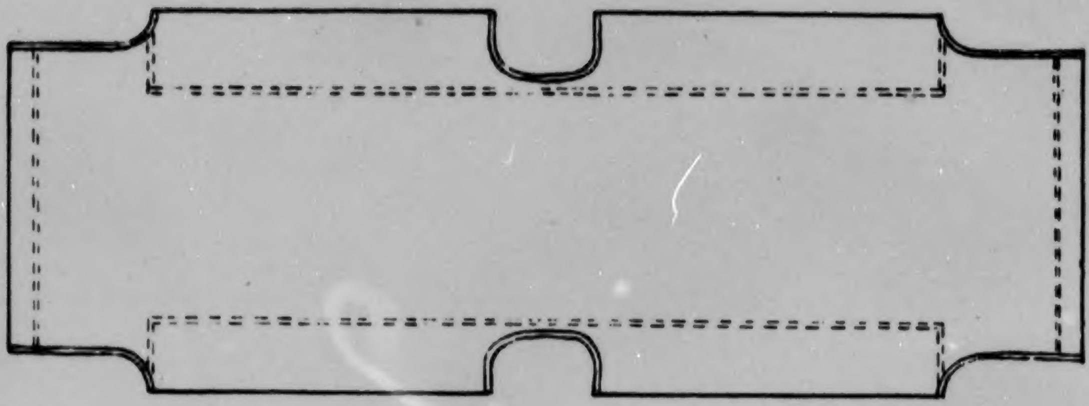

Figure 5-2. Canvas folding cot cover.

dimensions practical. Cut a patch so that it overlaps the damaged area by 1 inch on all sides. Fit this patch to the underside of the cover. Cut the corners of the perimeter of the damaged area one-eighth of an inch, turn the perimeter under and sew it to the edge of the patch. Reinforce the patch with two parallel lines of stitching about one-quarter inch apart and one-quarter inch from the edge, stitching around the hole. Turn the outer edges of the patch back under one-eighth inch, and stitch them down. Use type 301 lockstitch, stitching 7 to 8 stitches per inch. Patch clean rips or splits not greater than 6 inches in length in the same way as holes are patched; however, do not turn under the perimeter of the opening, but bring both faces of the opening together, and sew to the patch throughout the opening with a zigzag stitch.

d. Replacing straps and stays. Check each strap and stay for serviceability, and replace damaged items.

e. Repairing or replacing hardware. Clean rust and corrosion from buckles and clips if they are otherwise in good condition. Replace damaged items with new ones.

f. Reassembling cot. After repairs have been made, reassemble the cot as follows:

(1) Properly position the side rails in the side tunnels of the cot cover.

(2) Bolt the "T's" on the center legs to the center ends of the side rails, using stove bolts, lockwashers, and nuts.

(3) Affix the stays and straps in their proper locations.

(4) Insert the end rails in the end tunnels of the cover, and affix them securely to the side rails.

(5) If the cover does not fit because of shrinkage, replace it with one of the proper size.

5-4. FINAL INSPECTION. See paragraph 1-4b.

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SECTION VI

M-1949, MOUNTAIN SLEEPING BAG WITH CASE

6-1. DESCRIPTION. The M-1949 mountain sleeping bag (fig. 6-1) is a mummy-shaped bag constructed with overlapping channels filled with a mixture of waterfowl feathers and down to provide insulation. The free-running slide fastener at the front opening has an attached webbing loop for ease of operation. The shape and design of the bag provide the most warmth for the least weight of the bag. The tapes at the feet of the bag are used to secure the bag when it is rolled. A sleeping-bag case (fig. 6-2) covers the outside of the sleeping bag and provides a water-repellent outer layer. The bag is constructed from olive-drab cotton balloon cloth, Army shade 3; the case is made from olive-drab cotton sheeting, shade 107.

6-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, tape, webbing, thread, batting, feathers and down, eyelets, and slide fastener.

6-3. REPAIR METHODS. Procedures for inspecting, cleaning, and repairing, and replacing components of the sleeping bag are described below.

a. Preliminary inspection and cleaning. See paragraph I-4a.

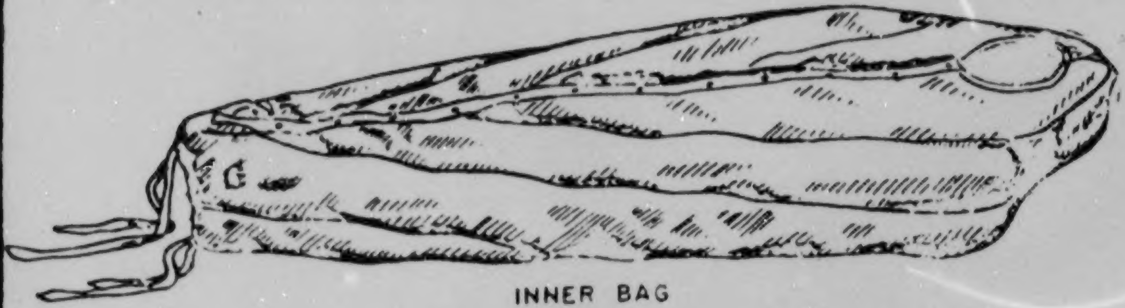
b. Stitching. Backstitch thread ends and breaks at least three-quarters of an inch. Maintain thread tension to prevent loose stitches.

c. Patching. Use iron-on patches in the repair of the sleeping bag. Apply these patches as follows:

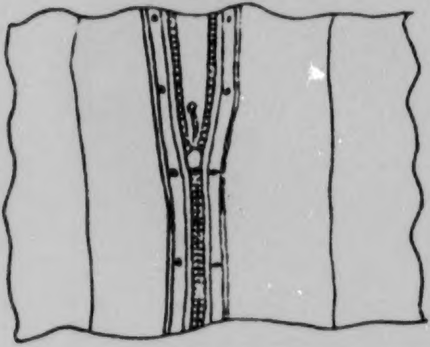
(1) Cut each patch to the desired size and shape so that, when applied, the patch will extend about three-quarters of an inch in all directions beyond the damaged area. Insure that patches have rounded areas.

(2) With the bag unzipped, place the area to be patched on a wooden or other nonmetallic surface not affected by the heat of ironing.

(3) Smooth out the bag by hand.



INNER BAG



DETAIL SHOWING SLIDE FASTENER ASSEMBLY

Figure 6-1. M-1949 mountain sleeping bag.

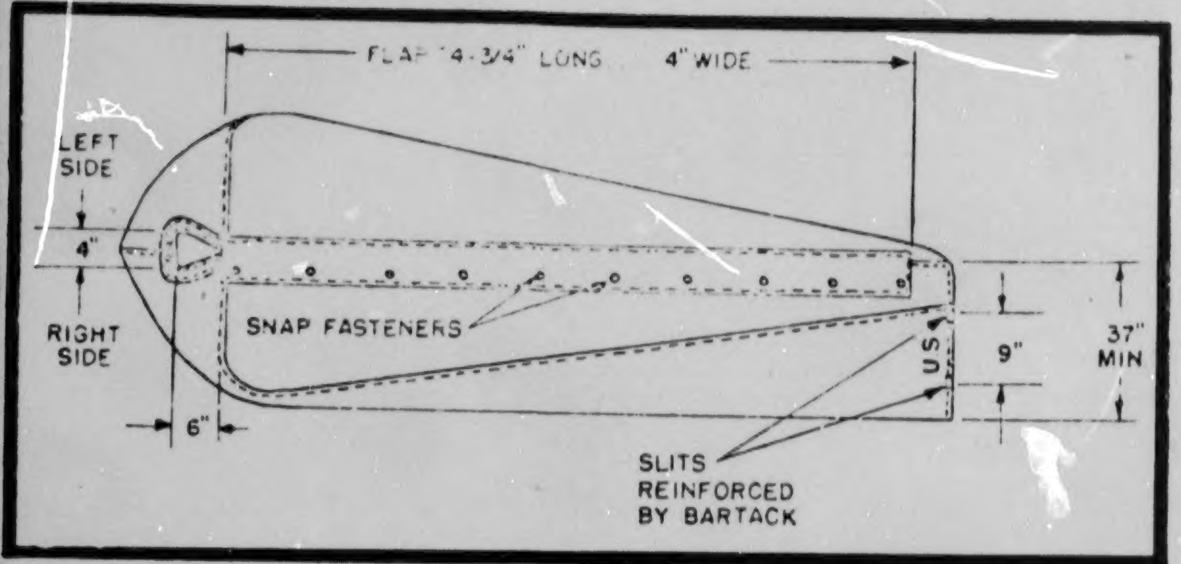

FLAP 14-3/4" LONG 4" WIDE
LEFT SIDE
4"
RIGHT SIDE
SNAP FASTENERS
6"
U.S.
9"
37" MIN
SLITS REINFORCED BY BARTACK

Figure 6-2. Sleeping bag case.

(4) Remove any feathers from the area to be patched.

(5) Prewarm the area to be patched by pressing it with a household, electric dry iron or steam iron. Use a dry iron set at "cotton," without scorching the fabric, for about 5 seconds.

(6) Immediately cover the damaged area with the patch previously cut.

(7) Hold the iron on the patch with a slight rotation of the iron for about 8 seconds.

(8) Remove the iron, and let the patch cool for about 5 seconds, or long enough for the patch to remain adhered to the surrounding material. Adjust the heating, pressing, and cooling times as required for the specific iron used.

(9) Test a patch by picking at the edge of the patch with the fingers until a tab one-quarter to one-half an inch long is formed. Pull hard on the tab with the fingers; if the patch is difficult to peel off, it is a well-bonded tab. Replace the test patch with a new patch or reiron the test patch.

(10) For patches larger than the iron, apply the patch in sections, starting at the center, and complete each section, one at a time.

d. Binding. Restitch loose or missing stitches in tape or webbing. Replace defective or missing tape or webbing with the appropriate materials.

e. Restoring filler. Beat the bag to fluff up the filler, to remove lumps and to restore even distribution of the filler. If required, replace filler that may have been lost through holes or tears with filler from salvaged bags.

f. Replacing 70-inch slide fastener. To replace a defective 70-inch slide fastener with a new one, carefully cut off the slide-fastener tape along the edges of the metal chain, and proceed as follows:

(1) Left side. Position the edge of the new slide-fastener tape between the 1 1/4-inch top guard webbing and the 2 1/2-inch weatherstrip tape, laying the slide-fastener tape against the stitching that fastens the guard

webbing in place. Attach the slide-fastener tape to the weatherstrip tape with a row of stitching one-eighth inch from the edge for the full length of the opening. Sew an additional row of stitching through the guard webbing, the weatherstrip tape, and the fastener tape about one-half inch from the edge of the guard webbing (farthest from the eyelets). The weatherstrip should not be caught in the stitching.

(2) Right side. Position the edge of the slide-fastener tape between the 1 1/4 inch top and bottom guard webbings, laying the slide-fastener tape against the stitching that fastens the guard webbing in place. Attach the slide-fastener tape to the bottom guard webbing with a row of stitching one-eighth inch from the edge for the full length of the opening. Sew an additional row of stitching through both the guard webbing and the fastener tape about one-half inch from the edge of the guard webbing farthest from the eyelets. Sew the fastener tape 1 to 1 1/4 inches beyond the foot end of the metal chain to the guard webbing with a double row of stitching across the webbing.

g. Replacing 72-inch slide fastener. Replace a defective 72-inch slide fastener in the same manner as the 70-inch slide fastener, except to sew together 2 inches of the weatherstrip tape at the foot end of the sleeping bag.

6-4. FINAL INSPECTION. See paragraph 1-4b.

SECTION VII

WATER PURIFICATION BAG

7-1. DESCRIPTION. The water purification bag (fig. 7-1) is constructed from canvas. There are two types of bags: One has stitched seams, and the other has sealed seams. The capacity of each bag is 36 gallons. The bag is cylindrical in shape and has a cone-shaped cover. It is equipped with 4, 5, or 8 faucets spaced equidistantly about 2 1/2 inches above the bottom of the bag. The cover is constructed to fit over the suspension ropes, and the bag is furnished with a drawstring for securing a tight fit.

7-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-4: suspension ropes, drawstring rope, thread, faucets, grommets, and wire (for rings). Ropes must not contain mildew inhibitor or chemicals of a poisonous nature.

7-3. REPAIR METHODS. Procedures for inspecting, cleaning, and repairing, and replacing components of the water purification bag are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Stitching. Restitch bags or covers that have broken or missing stitching, worn, or rotten thread. Use the 301 lockstitch, and sew 7 stitches per inch on the bag and 8 stitches per inch on the cover. Do not attempt to repair sealed-seam bags.

c. Replacing or repairing rope. Replace ropes of incorrect lengths or ropes that have badly frayed ends, worn or broken strands. Repair rope with frayed ends by hand whipping (fig. 7-2).

d. Replacing faucets. Replace a defective or missing faucet, making sure that the replacement faucet is of the same type of material as that being replaced, that is, either metal or plastic. The finished bag must be equipped with either all metal or all plastic faucets.

e. Replacing grommets. Replace defective or missing grommets in the disc of the cover top. Make sure that all grommets are securely set, but do not cut the cover.

1004.

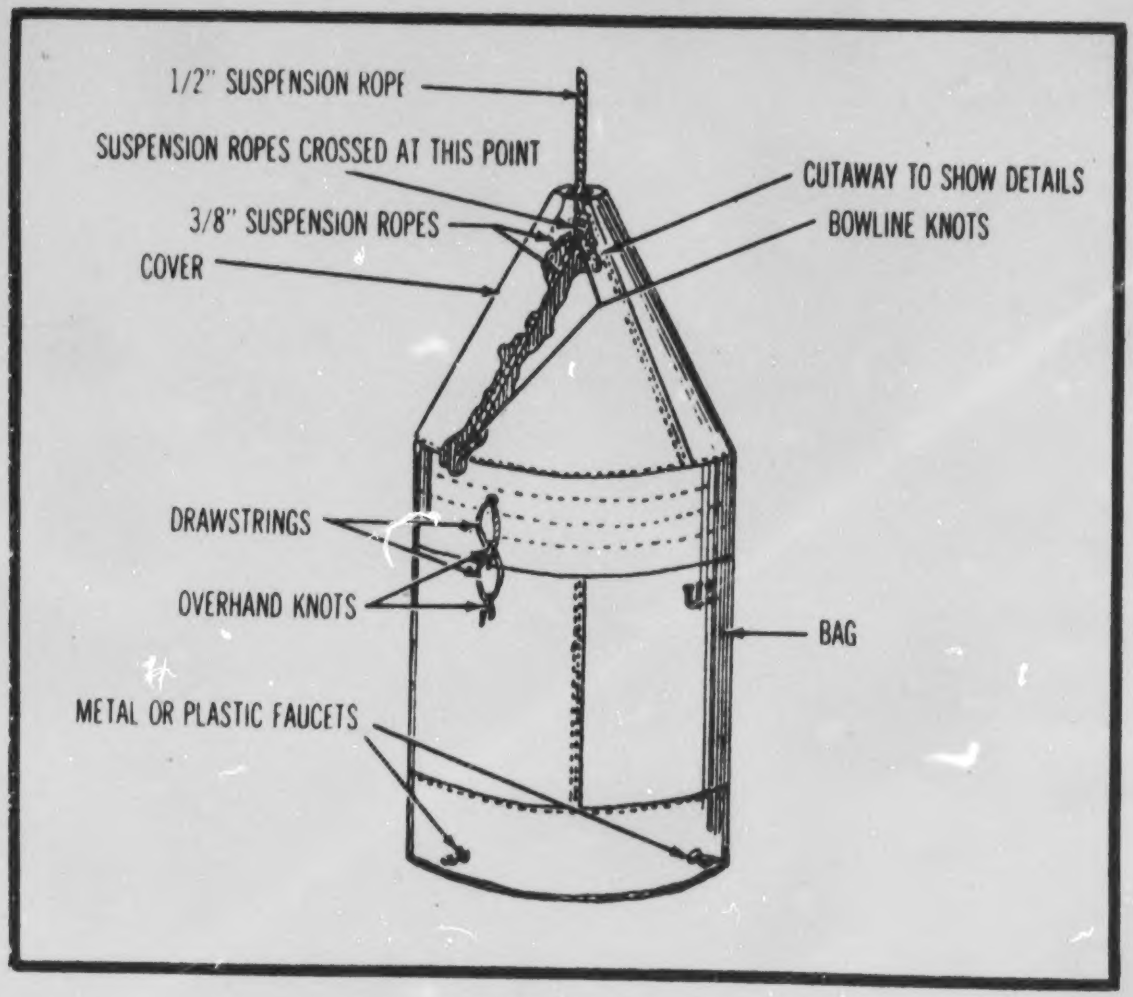

1/2" SUSPENSION ROPE
SUSPENSION ROPES CROSSED AT THIS POINT
3/8" SUSPENSION ROPES
COVER
CUTAWAY TO SHOW DETAILS
BOWLINE KNOTS
DRAWSTRINGS
OVERHAND KNOTS
BAG
METAL OR PLASTIC FAUCETS

Figure 7-1. Water purification bag.

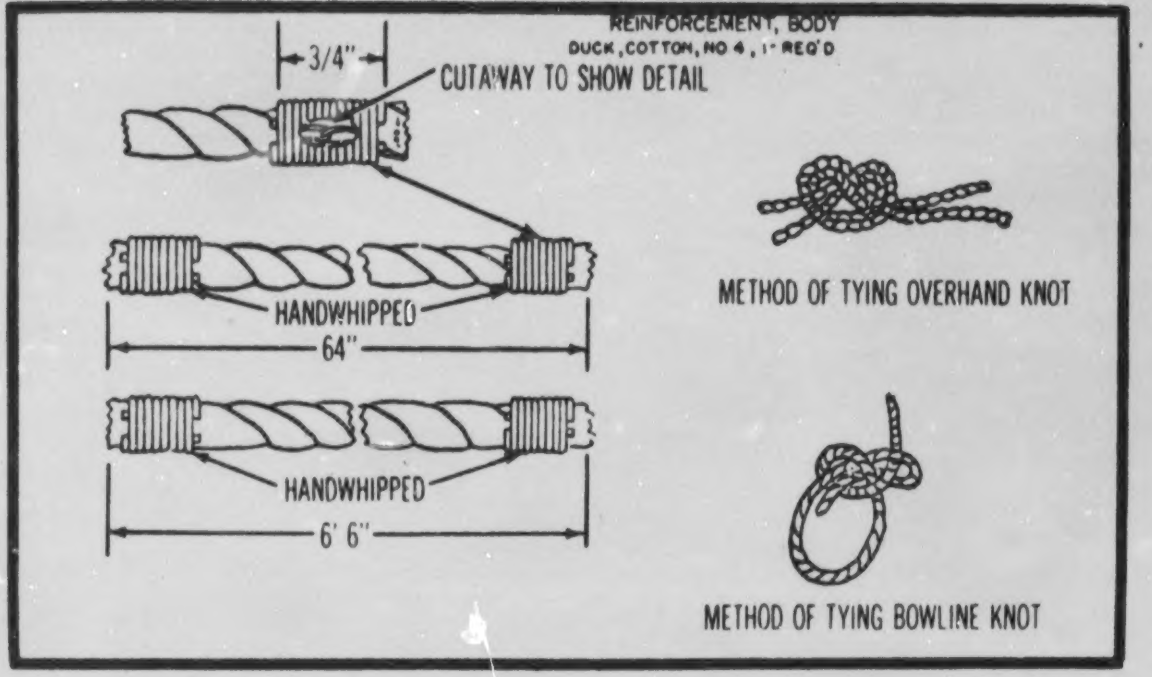

REINFORCEMENT, BODY
DUCK, COTTON, NO 4, 1- REQ'D
3/4"
CUTAWAY TO SHOW DETAIL
HANDWHIPPED
64"
HANDWHIPPED
6' 6"
METHOD OF TYING OVERHAND KNOT
METHOD OF TYING BOWLINE KNOT

Figure 7-2. Hand whipped ropes.

f. Repairing or replacing rings. Straighten misalined rings that are not out of line more than 1 inch in any direction. Replace missing rings, rings that are out of line more than 1 inch in any direction, rusted or corroded rings, and electrozinc-coated rings.

7-4. FINAL INSPECTION. See paragraph 1-4b.

NOTE: ORIGINAL PAGE 394 HAS BEEN OMITTED; HOWEVER ALL MATERIAL IS INCLUDED.

SECTION VIII

SHELTER-HALF TENT

8-1. DESCRIPTION. The shelter-half tent (fig. 8-1) is constructed from 8.25-ounce, mildew-, water-, and weather-resistant cotton duck. The shelter half is olive drab, Army shade 7. It is attached to another shelter half with stud snap fasteners and has triangular closing straps on both ends. The shelter half is equipped with a guy line and five foot-stop lines. Overall length of the shelter half is 154 1/2 inches. Two shelter halves joined together form a tent for two men. Snap fasteners are provided along the lower edge of the shelter half to permit six shelter halves to be joined together to form a six-man tent. The ridge of the tent is formed by tentpoles at each end, and the sides are secured to the ground with pins that are placed through the foot stops.

8-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, thread, ropes, grommets, and snap fasteners.

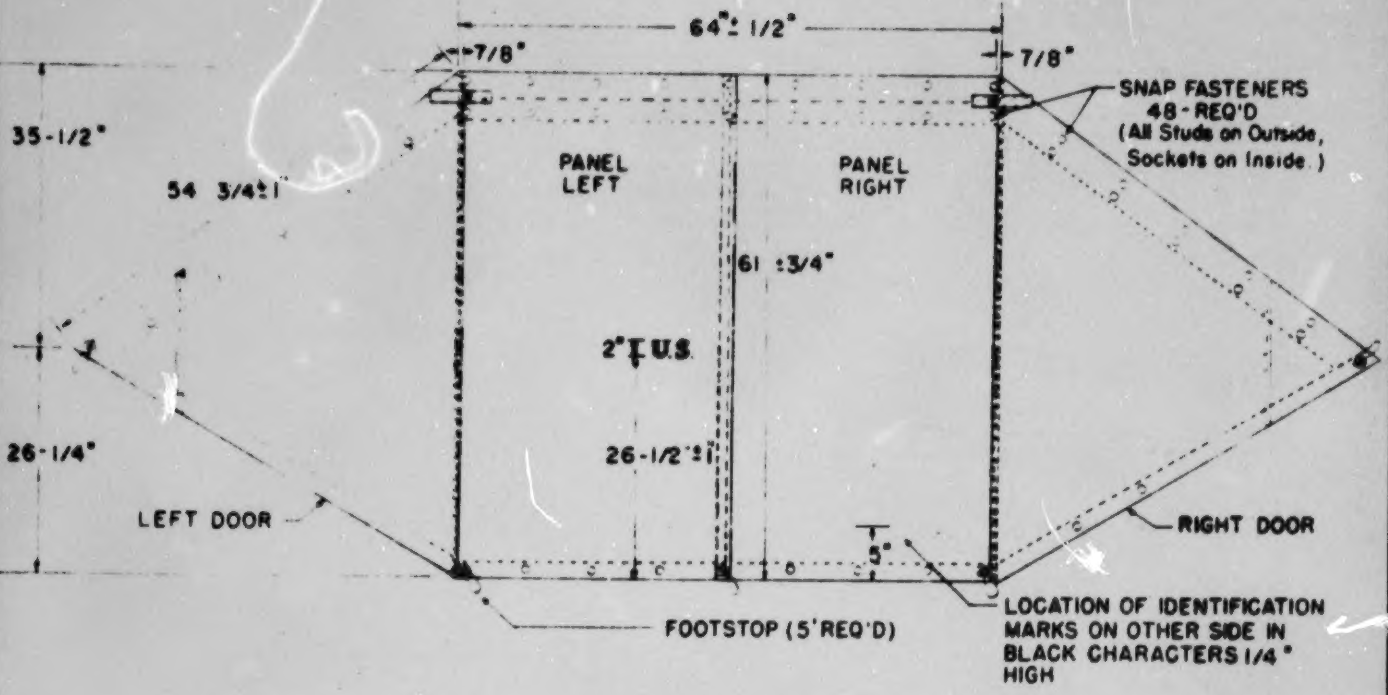

64" ± 1/2"
7/8"
7/8"
SNAP FASTENERS 48-REQ'D (All Studs on Outside, Sockets on Inside.)
35-1/2"
54 3/4 ± 1"
PANEL LEFT
PANEL RIGHT
61 ± 3/4"
2" U.S.
26-1/4"
26-1/2" ± 1"
LEFT DOOR
RIGHT DOOR
5"
FOOTSTOP (5' REQ'D)
LOCATION OF IDENTIFICATION MARKS ON OTHER SIDE IN BLACK CHARACTERS 1/4" HIGH

Figure 8-1. Shelter-half tent.

8-3. **REPAIR METHODS.** Procedures for inspecting, cleaning, repairing, and replacing components of the shelter-half tent are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Stitching. Follow procedures in paragraphs 3-3b(2). Typical methods of stitching chapes are shown in figure 8-2.

c. Patching. Machine stitch all patches (fig. 8-3). Use the watershed patch for general repair except at the ridge of the tent where a rectangular type is required. Limit the number of patches to six patches on each side and four patches on each end. In addition, limit the total area of patches on each side panel and each end panel to not more than 25 percent of the area of the panel. Remove and replace panels or panel sections when patching would weaken the panel or exceed limitations. See figures 8-4 through 8-11 for details of patch construction. Procedures for patching are as follows:

(1) Cut patches from matching salvaged material to closely match the item being repaired, or cut them from new material.

(2) Cut each patch large enough to overlap the damaged area 2 3/4 inches on all sides.

(3) In making the watershed patch, fold-in the patch to make a roof-type top edge, cutting from open edges to the folded center at an angle of about 22.5°. Center the patch over the damaged area, and turn under the raw edge three-quarters of an inch. Stitch the patch into place with a row of stitching not farther than one-eighth of an inch from each edge. Turn the tent over and trim the damaged area, allowing enough material to turn under one-half inch. Sew one-eighth inch from the edge of the turned under material.

(4) For repairing an area where a grommet has torn loose, use a grommet patch. Cut the patch large enough to allow folding the material over both sides of the damaged area. Center the patch with the raw edge (folded part) facing in. Stitch the patch in place with a row of stitching one-eighth inch from the edge. Position and install a new grommet centered in the patch.

(5) Do not remove previously installed cement patches if they are serviceable; however, sew around the outer edge with two rows of stitching, the first row one-eighth inch from the edge and the second row one-quarter inch from the first row.

1009

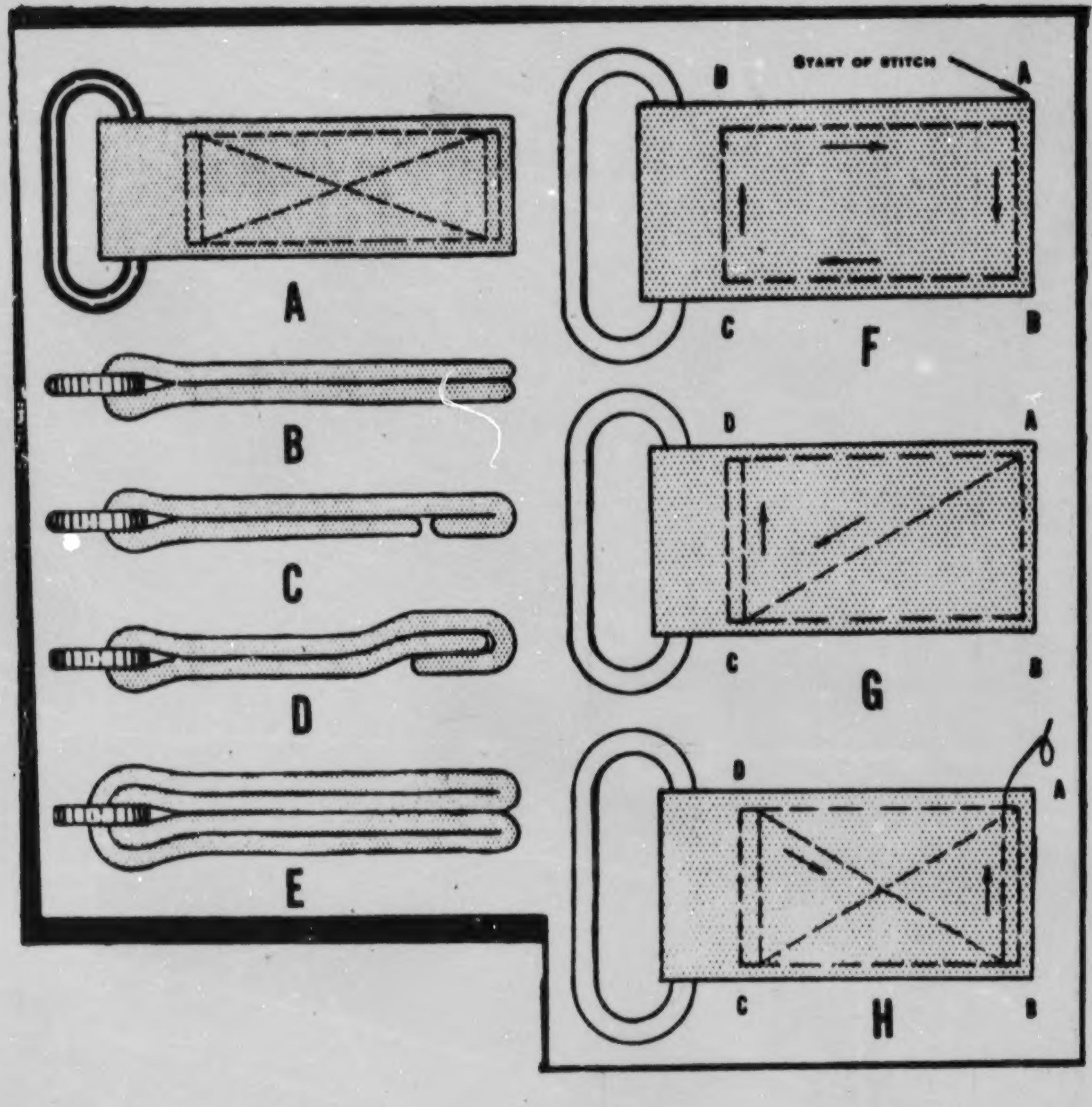

START OF STITCH
A
B
C
D
E
F
G
H
D
A
C
B
D
A
C
B
D
A
C
B

Figure 8-2. Webbing folded and chapes stitched.

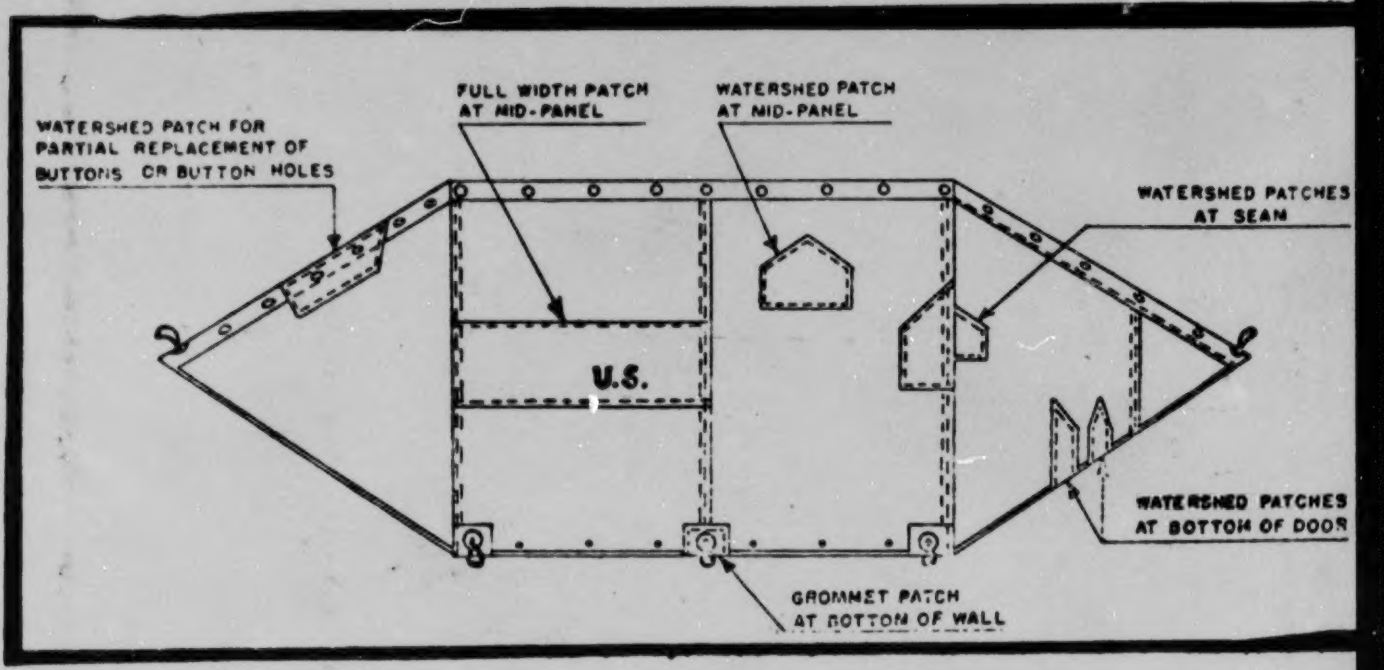

WATERSHED PATCH FOR PARTIAL REPLACEMENT OF BUTTONS OR BUTTON HOLES
FULL WIDTH PATCH AT MID-PANEL
WATERSHED PATCH AT MID-PANEL
WATERSHED PATCHES AT SEAM
U.S.
WATERSHED PATCHES AT BOTTOM OF DOOR
GROMMET PATCH AT BOTTOM OF WALL

Figure 8-3. Types of patches.

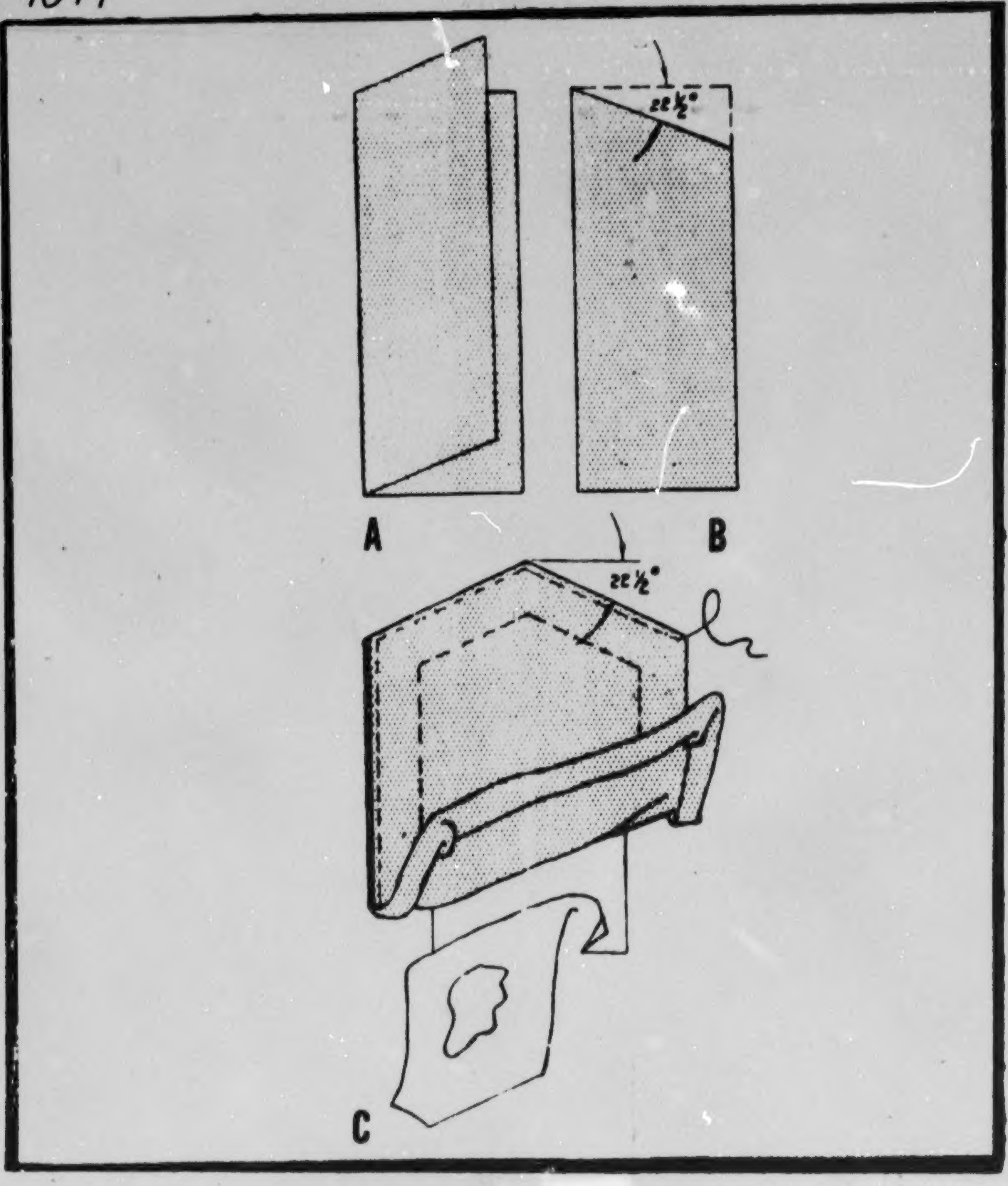


Figure 8-4. Construction of watershed patch.

1012

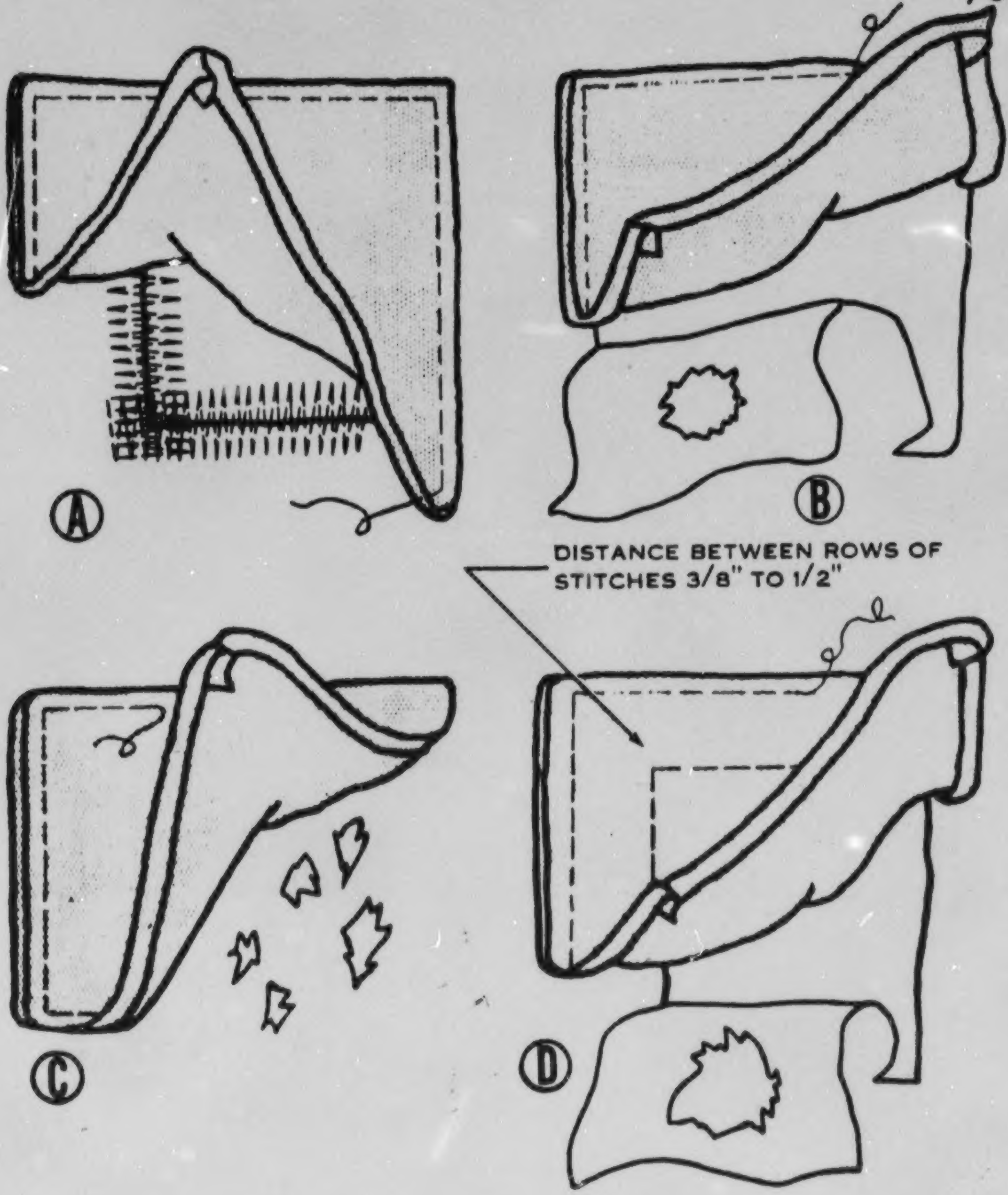

A
B
DISTANCE BETWEEN ROWS OF STITCHES 3/8" TO 1/2"
C
D

Figure 8-5. Construction of simple top patches.

1013

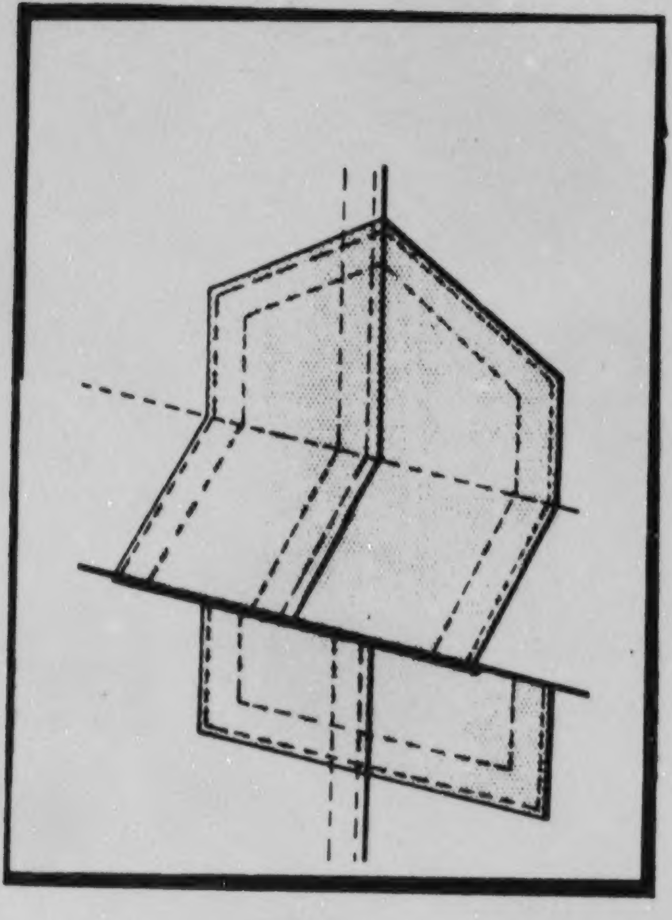


Figure 8-6. Eave-base patch.

1014

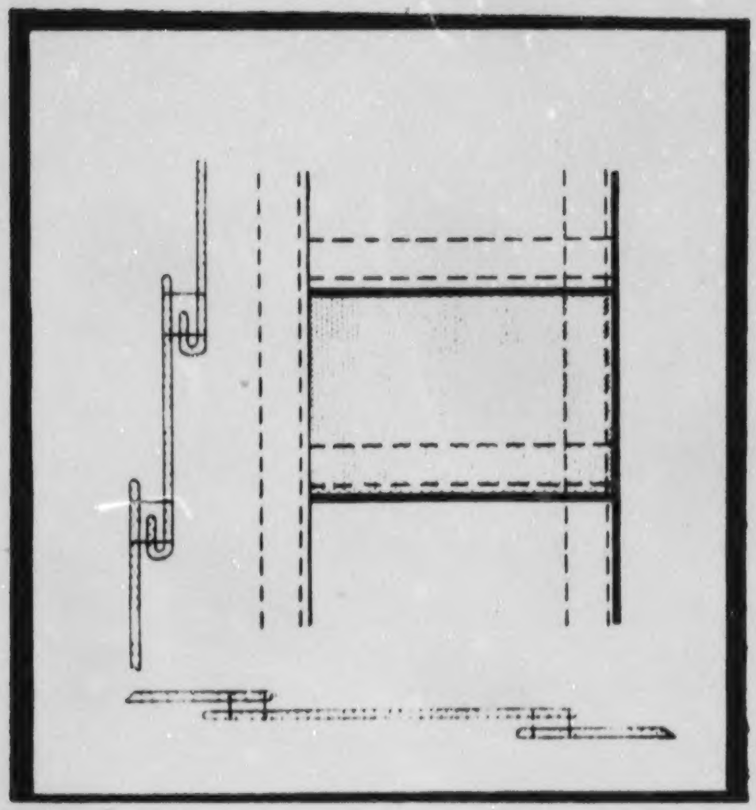


Figure 8-7. Completed seam-to-seam patch.

1015

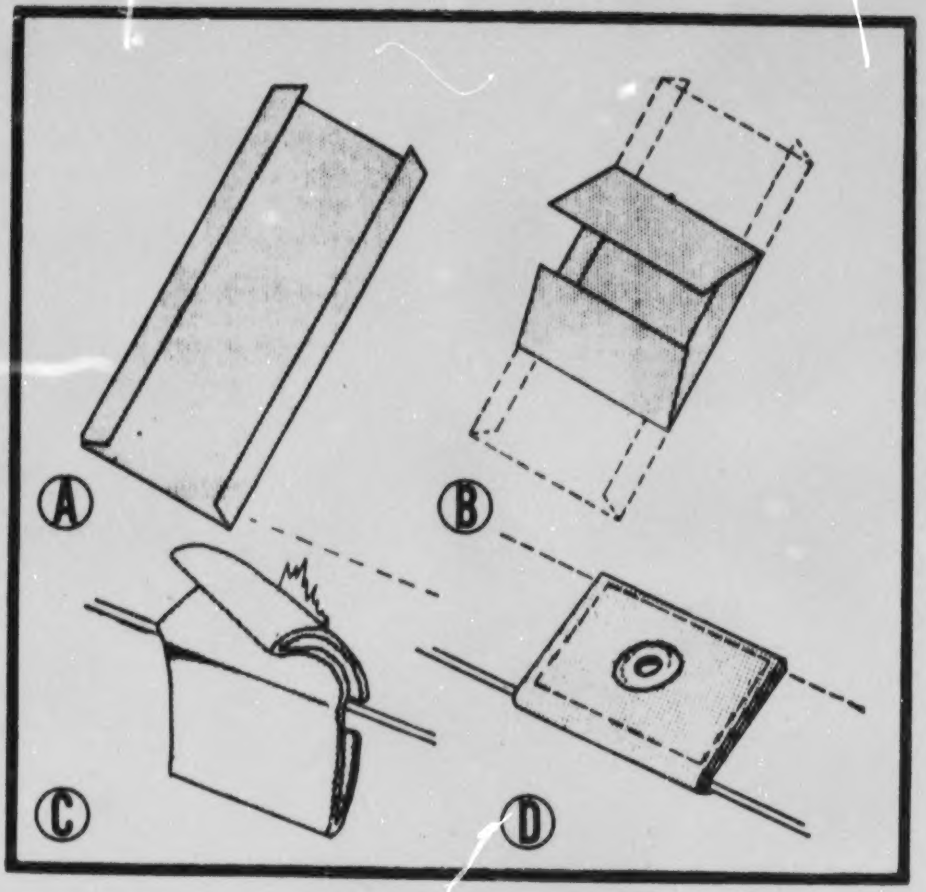
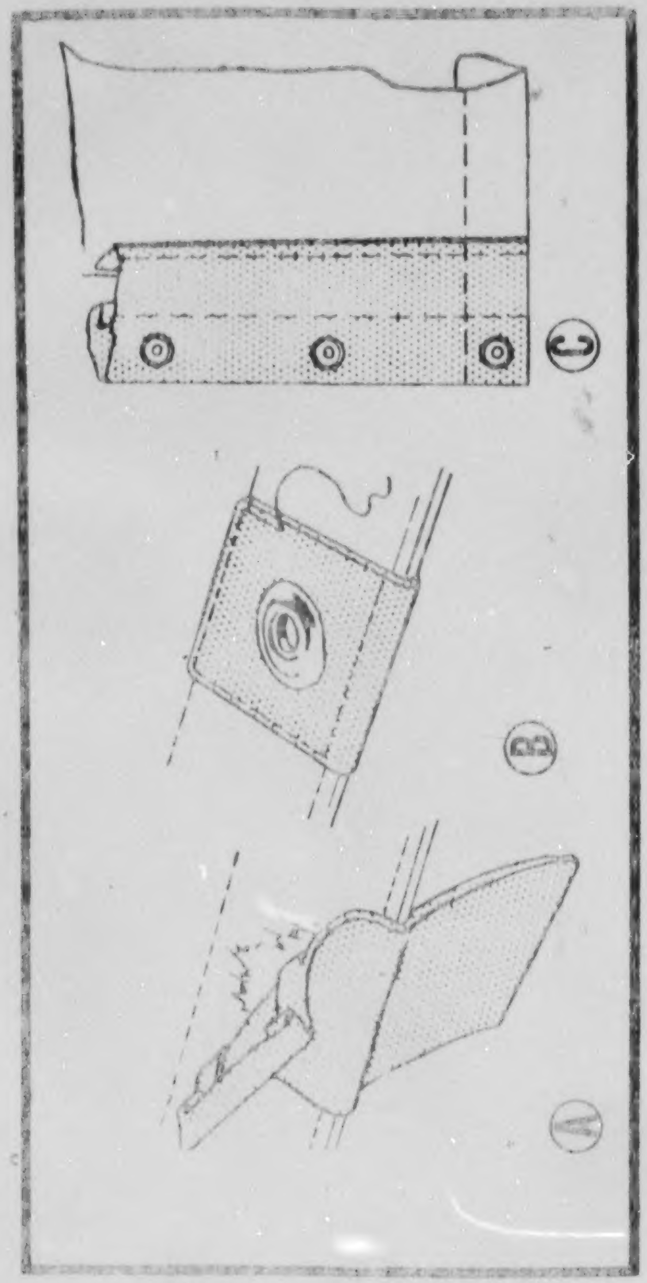


Figure 8-3. Construction of four-thickness grommet patch.



Figu[illegible]8-9. Construction of overedge grommet patch.

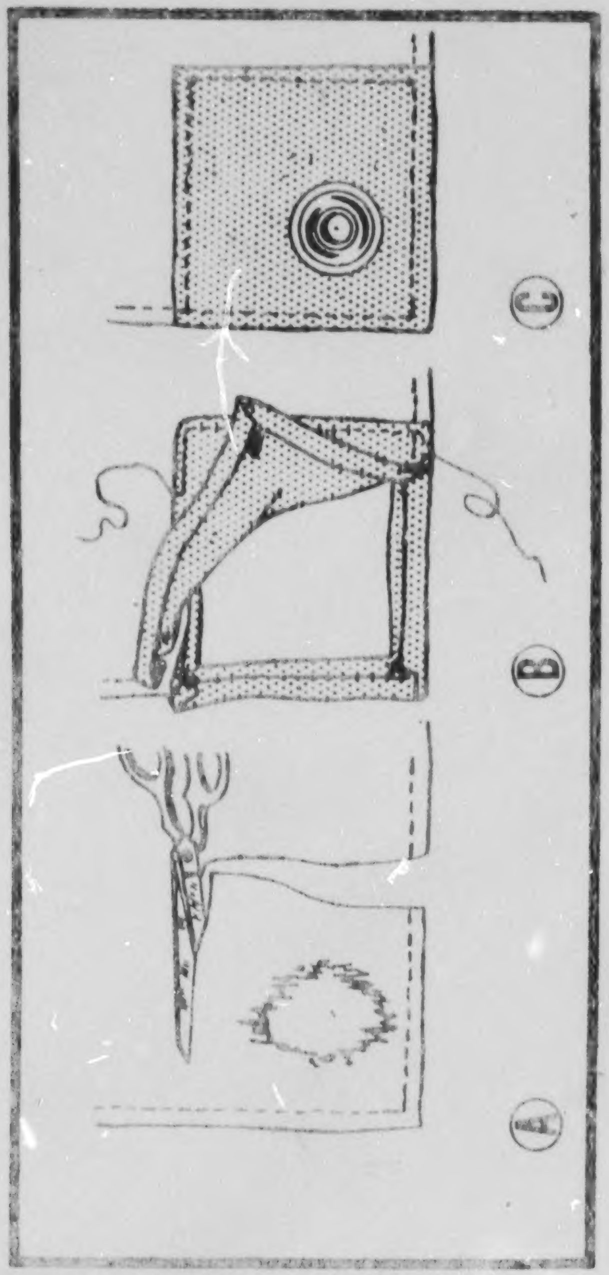


Figure 8-10. Construction of reinforced grommet patch.

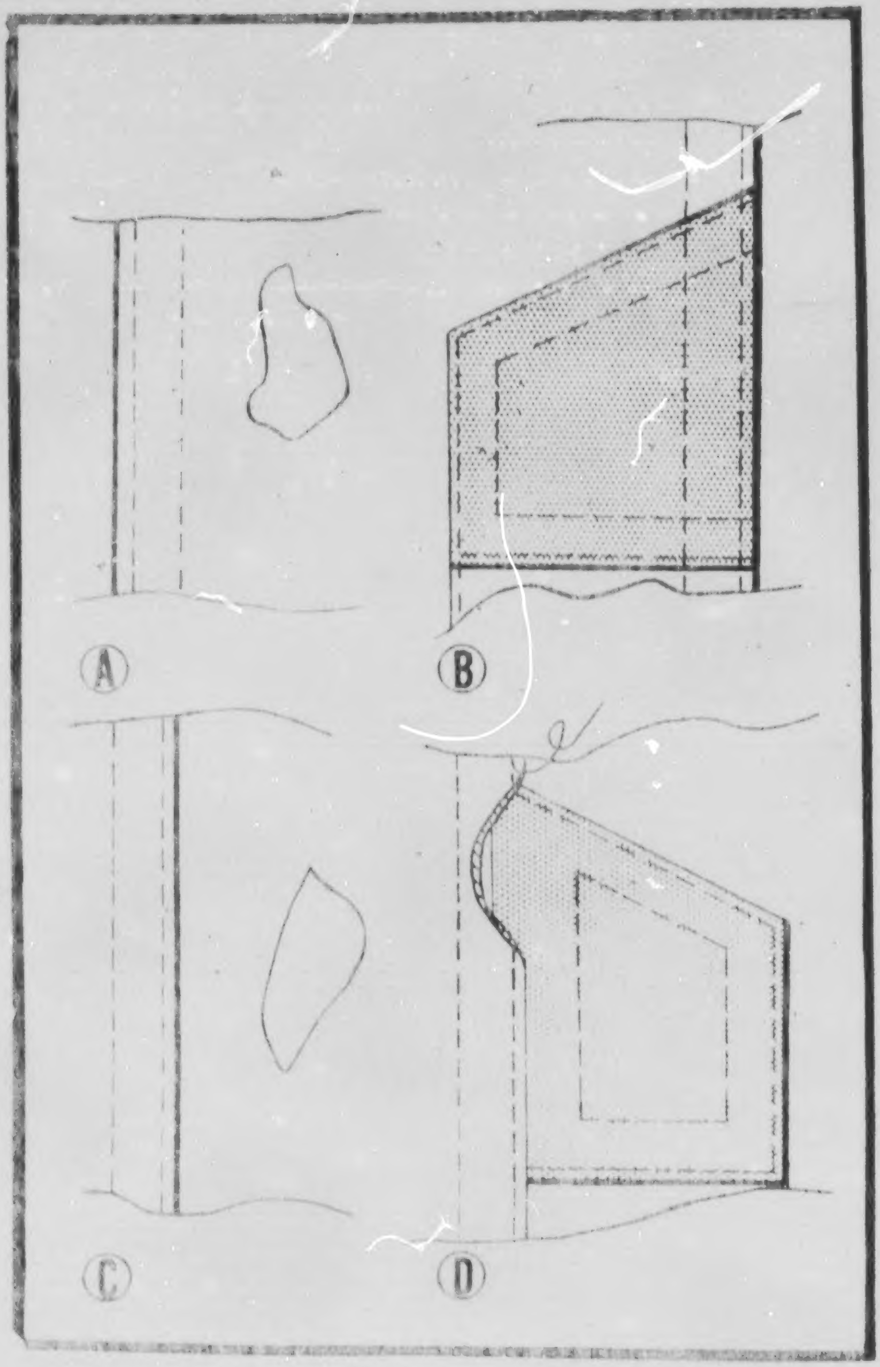


Figure 8-11. Construction of a patch over a seam.

(6) Repair areas involving lapped seams of panels with two watershed patches by ripping open the seams about 6 inches above and below the damaged area; then cutting and centering one patch as in (2) and (3) above on the bottom ply of the seam and a second patch on the top edge of the seam, finishing by overlapping the top panel on the bottom panel and restitching the seam as in the original construction.

8-4. FINAL INSPECTION. See paragraph 1-4b.

SECTION IX

TWO-MAN MOUNTAIN TENT

9-1. DESCRIPTION. The two-man mountain tent (fig. 9-1) is designed to be used in high altitudes and in arctic regions to accommodate two men. It is made from 5.8 ounce fire-, mildew-, water-, and wind-resistant cotton twill. It is olive drab, shade 7, on one side, and white on the other. The tent is equipped with cloth flooring material. The floor area dimensions are 6 feet 10 3/8 inches long by 54 5/8 inches wide. At the ridge, the tent is 6 feet 10 inches long by 43 7/8 inches high. Components consist of 2 adapters, 6 pins, and 12 poles. An entrance tunnel and a ventilator are provided in the tent at each end. The tunnel opening may be closed with tunnel fabric or tunnel screen liner. The olive-drab and white sides may be reversed for camouflage.

9-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, netting, webbing, tape, thread and twine.

9-3. REPAIR METHODS. Procedures for inspecting, cleaning, and repairing and replacing components of the two-man mountain tent are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Stitching. See paragraph 3-3b(2).

c. Patching. Patch each damaged area with two patches: an olive-drab patch on the olive-drab side of the tent and a natural color patch on the white side of the tent. Cut the two patches the same size and 2 3/4 inches larger on all sides than the damaged area. Center one patch over the damaged area, and turn under the patch edges three-fourths inch. Stitch the patch in place. Cut away the damaged area, and center the second patch with the edges turned under to the area to which the first patch was applied, insuring that the two patches are alined. Stitch the second patch in place. Use watershed patches except on the ridge of the tent; use a rectangular patch on the tent ridge. Use diamond-shaped patches on the ventilators and tunnels. Use a 301 lock stitch.

d. Replacing or repairing netting. Replace netting that is torn or damaged with a piece of new netting unless the damage is minor and can be patched satisfactorily.

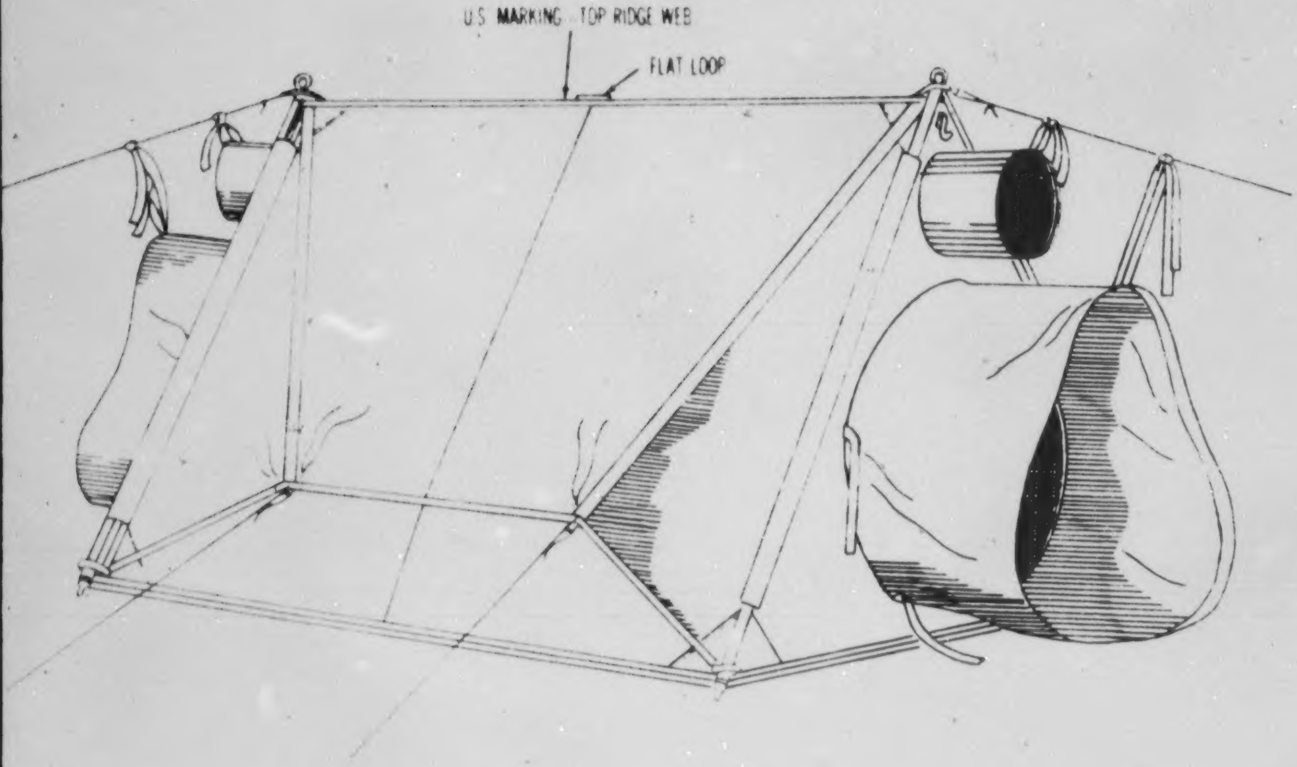

U.S. MARKING
TOP RIDGE WEB
FLAT LOOP

Figure 9-1. Two-man mountain tent.

e. Replacing webbing, straps, loops, and tie tapes. Replace worn, abraded, cut or otherwise damaged webbing, straps, loops, or tie tapes with matching material. Restitch loosely attached webbing, using original construction methods.

f. Replacing ventilators and tunnels. Replace ventilators and tunnels that are damaged beyond minor patching with new ones matching the original.

g. Replacing reinforcements. Replace defective corner reinforcements with appropriate matching reinforcements.

h. Repairing or replacing lines and foot stops. Cut off frayed lines up to 4 inches, and repair them by machine stitching or hand whipping. Replace missing or irrepairable lines and foot stops with the appropriate matching items.

i. Replacing label. Replace the label with the appropriate reproduction cut from material matching that of the original label. Fabricate the new label to size, 8 by 10 1/2 inches, with a half-inch margin on all sides. Insure information on the label is a copy of the original and is clearly and neatly done.

j. Re-marking. Restencil or reprint the letters "U S." when previous markings are faded, obliterated, or missing. Stencil letters three-quarters of an inch high.

9-4. FINAL INSPECTION. See paragraph 1-4b.

SECTION X

M-1945 COMMAND-POST TENT

10-1. DESCRIPTION. The M-1945 command-post tent (fig. 10-1) is made from 9.85-ounce cotton duck. It is olive drab, Army shade 7. The material is fire, mildew, water, and weather resistant. The tent is equipped with a cover, liner, screens, lines, and slip liners. Overall dimensions are 20 feet 7 inches long by 10 feet wide by a peak height of 9 feet and a sidewall height of 5 feet 6 inches. The tent is used to provide office space for staff sections in the combat area. It may also be used as an aid station.

10-2. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: cloth, thread, webbing, screening, film (for window panes) ropes, twine, grommets, snap fasteners, clips, buckles, ridge plates, triangles, fairleaders, and bulleyes. Certain tent components, i.e., blackout curtain, tent screen, and tent lines, may be ordered through routine supply channels.

10-3. REPAIR METHODS. Procedures for inspecting, cleaning, re-treating, and repairing and replacing components of the command-post tent are described below.

a. Preliminary inspection and cleaning. See paragraph 1-4a.

b. Stitching. See paragraph 3-3b(2).

c. Patching. Exercise care in patching the tent body, and observe the prescribed limitations in patching.

(1) Limiting patches. Do not patch small holes inside walls that are one-quarter inch or less across their greatest diameter. Do not patch more than 50 percent of the panels except for nail holes, in which case, patch up to 75 percent of the panels. Where additional patching would weaken the tent, remove sections of a panel, or the whole panel, and replace. Repair damaged areas involving lap seams of panels, with two patches.

(2) Applying patching and repairing tent body. Make all patches of the watershed type where practical and sew on the outside except when a cross-section the full width of a panel is replaced. In such repair, sew the upper edge of the patch on the underside and the lower edge of the patch on the outside. Sew patches to the tent body with

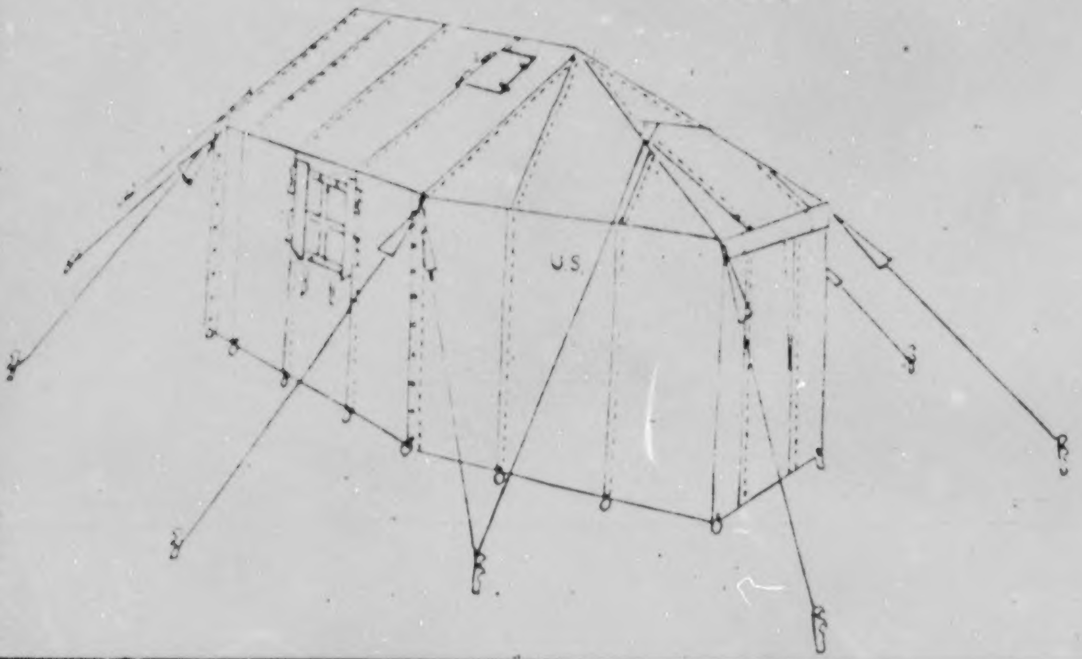


Figure 10-1. M-1945 command-post tent.

two parallel rows of stitching one-quarter inch apart, with the outer row of stitching about one-eighth inch from the outer edge of the patch. Patch all mildewed and rotten areas previously marked. Inspect previously patched areas, and if defective, repair them. Do not apply cement patches; however, if previously applied cement patches are serviceable and the surrounding area needs no repair, sew a row of stitches around the outer edges of the patch as required for regular patches. Do not patch more than 50 percent of a panel except for nail holes; in which case, patch 75 percent of the panel. Trim damaged areas under large patches to remove irregular areas. If a cut is clean, with no fraying, darn it along its entire length plus one-half inch beyond its ends; then patch the cut. Patch all holes in the roof, no matter what their size, provided the patches do not exceed patch limitations. Repair damaged areas near a panel edge; however, rip out one row of stitches along the panel edge, insert the panel edge there, replace the panel, and sew the panel over the patch edge. Remove sections of panels, and replace them if additional patching would weaken the member or result in too many patches. Repair damaged areas of lap seams of panels with two patches of the appropriate type. Replace all weak and rotten stitching along panel edges with new stitching. Repair or replace flaps on ventilators, stovepipe openings, and windows as described above. Remove improperly positioned flaps that cause buckling, and restitch them in the proper locations. Repair or replace torn or abraded reinforcements. Remove a torn, mildewed, or otherwise defective sod cloth; remove the damaged section; insert a new section; and stitch it to the serviceable portion. Figures 10-2 through 10-11 show patching on the command-post tent.

d. Repairing or replacing webbing. Replace worn, abraded, cut, or otherwise damaged webbing. Restitch loosely attached webbing by following the original construction methods.

e. Repairing or replacing liner. Repair the liner by patching in the same way the tent body is patched; however, there are no limitations on the number of patches. Instead of making an excessive number of patches to a panel, however, remove and replace the panel.

f. Repairing or replacing blackout curtain. Repair defective parts, areas, and sections of the blackout curtain as necessary. Observe the same limitations on patching the curtain as those applied to the tent body. Replace the curtain if required, but insure that a new or repaired curtain conforms to the original dimensions and fit so that blackout conditions may be maintained.

1026

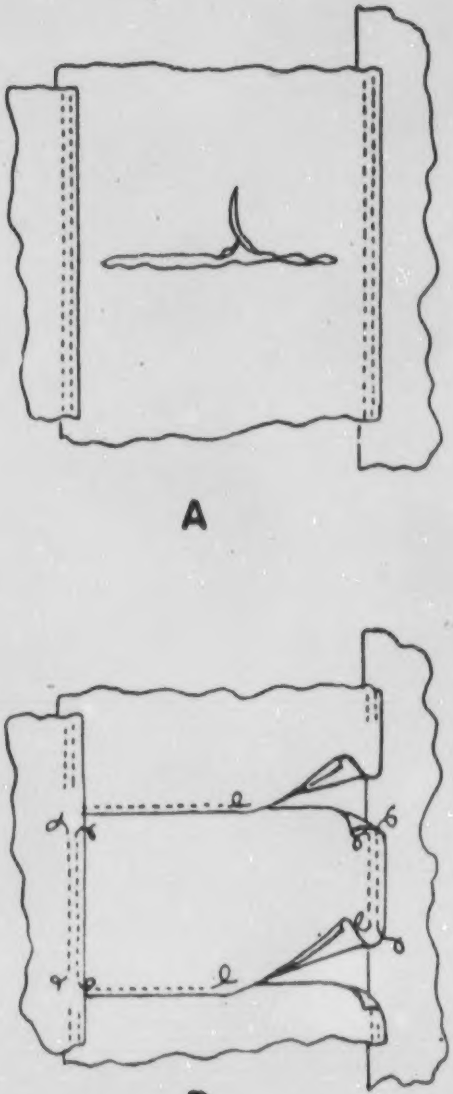


Figure 10-2. Full-width patch at midpanel.

477

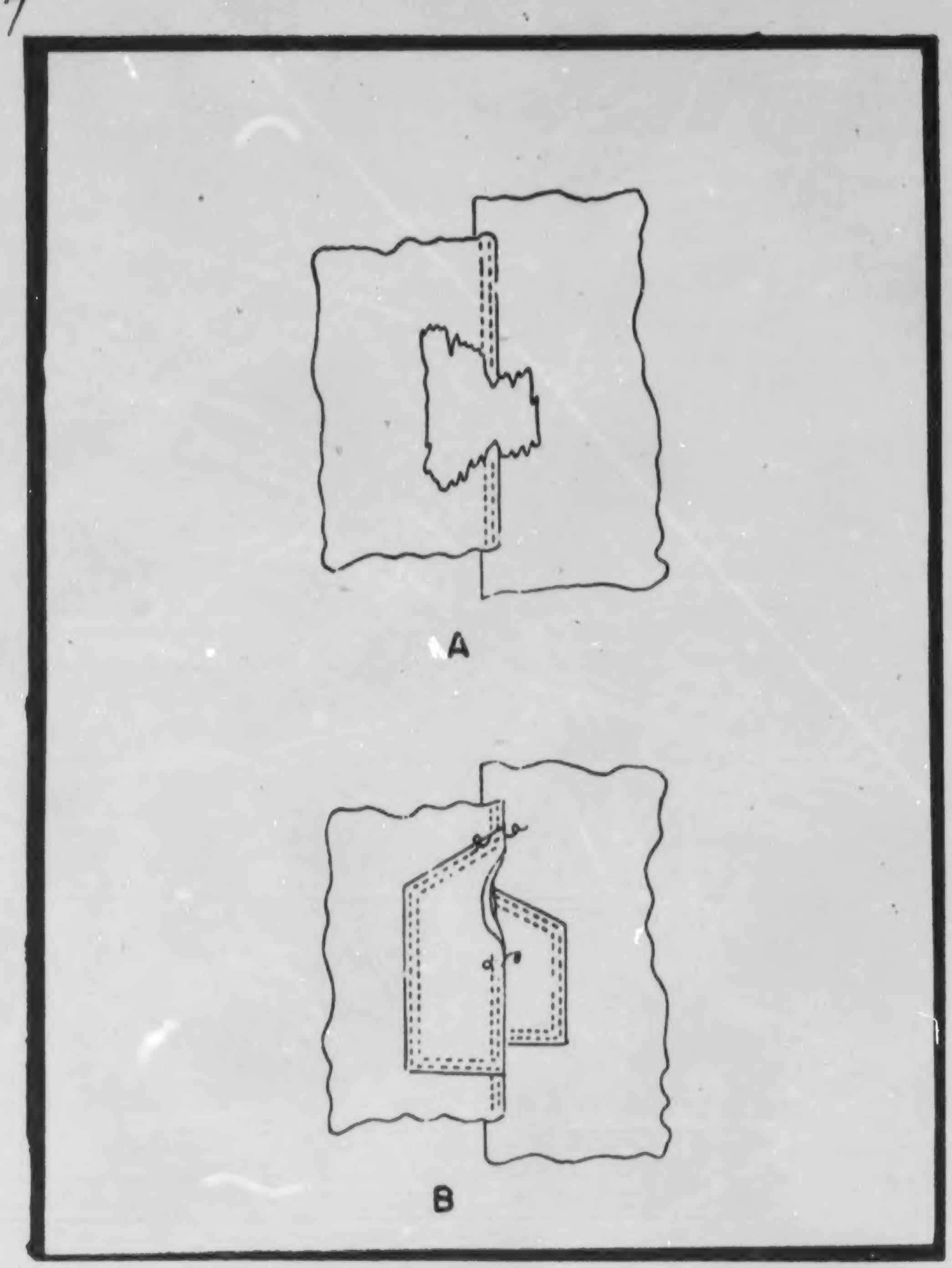


Figure 10-3. Watershed patch at seam.

1028

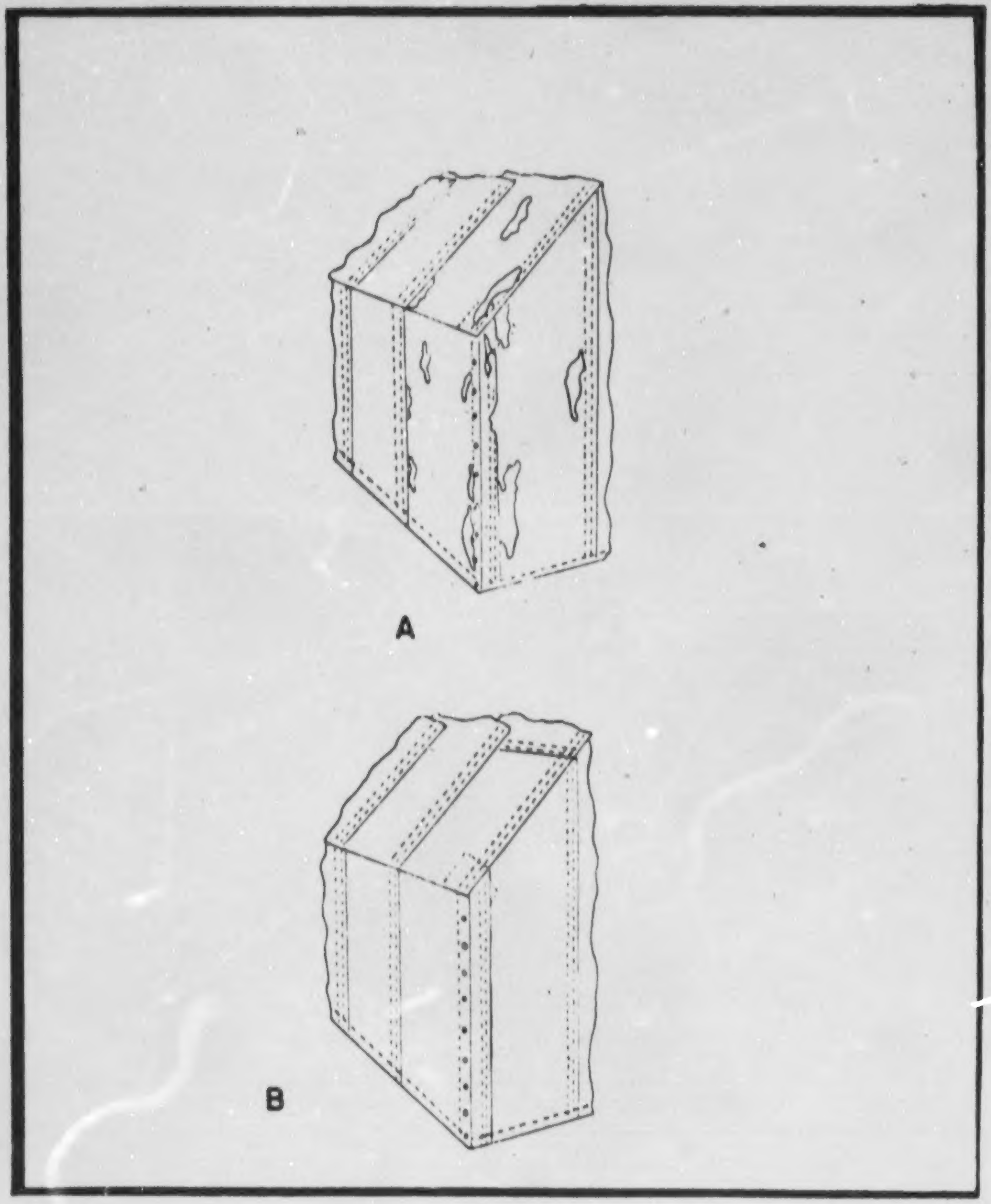


Figure 10-4. Full and partial panel replacement.

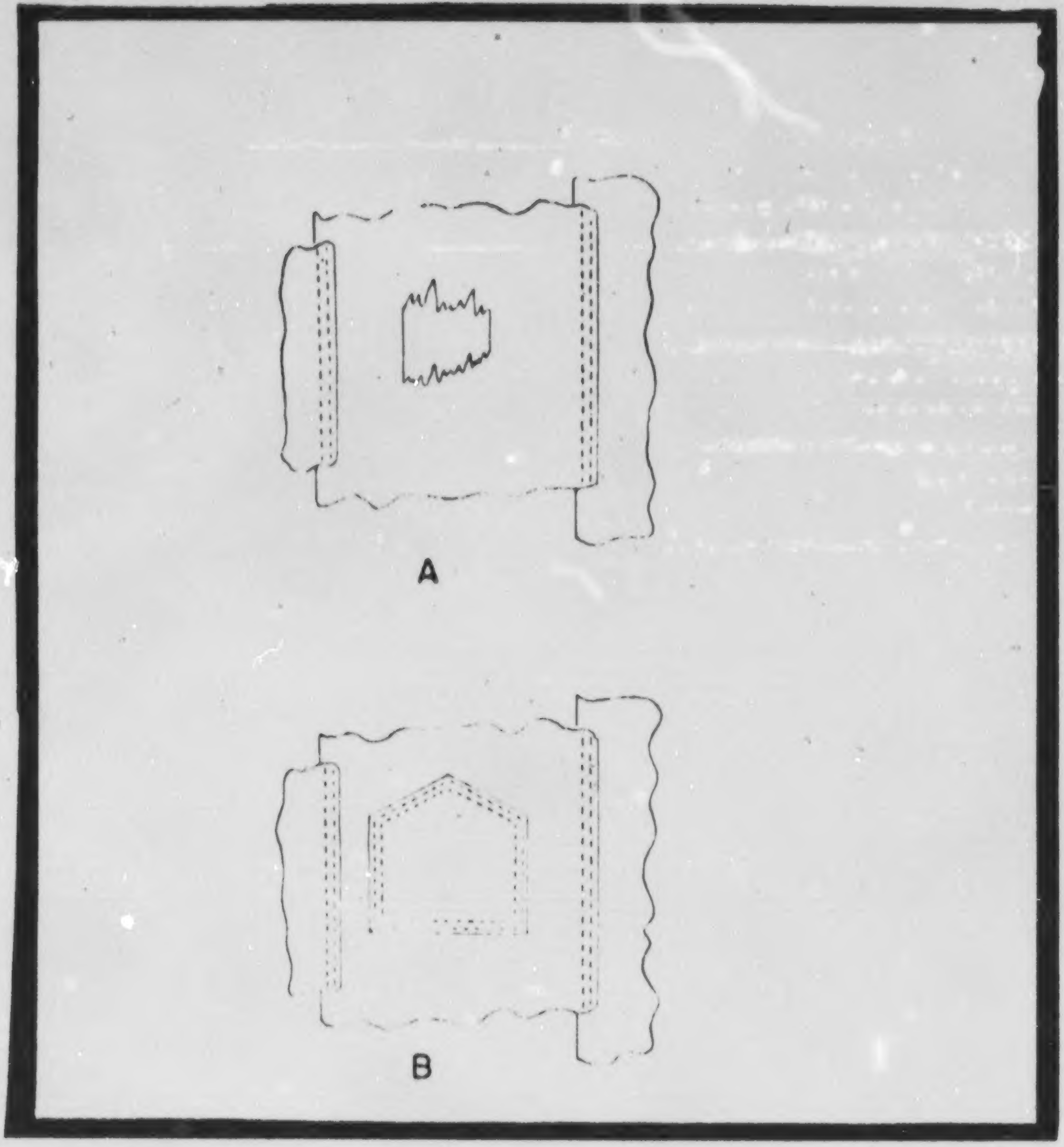


Figure 10-5. Watershed patch at midpanel.

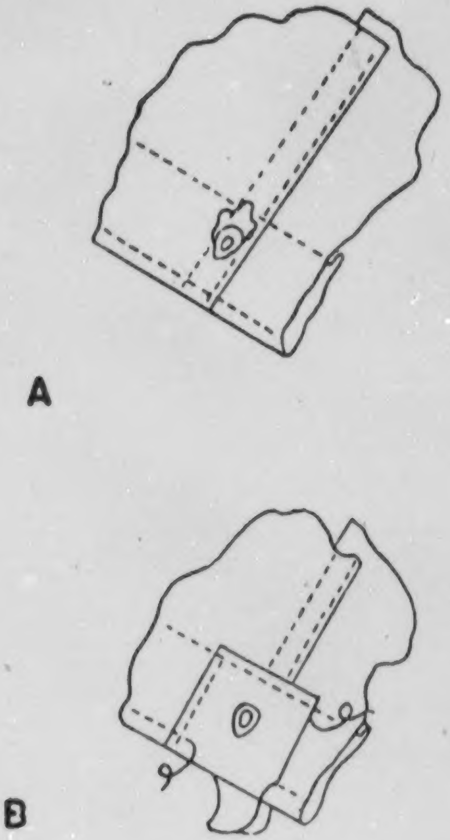


Figure 10-6. Ground-edge grommet patch.

1031

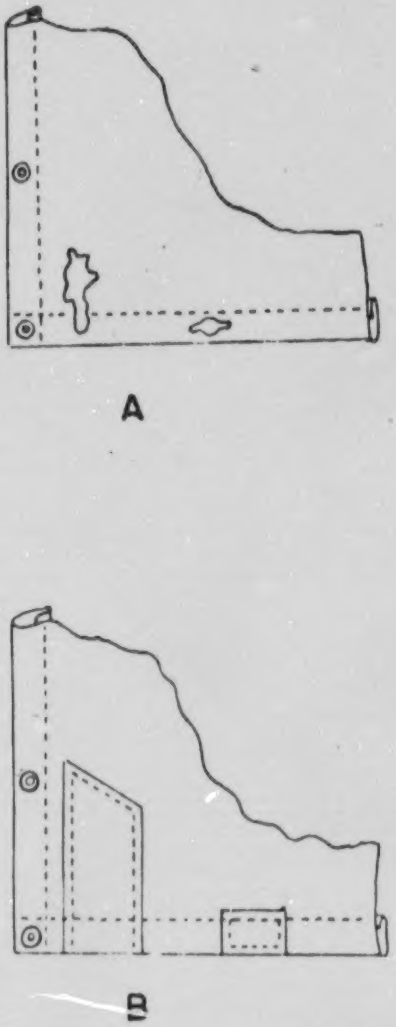


Figure 10-7. Patches at bottom of wall.

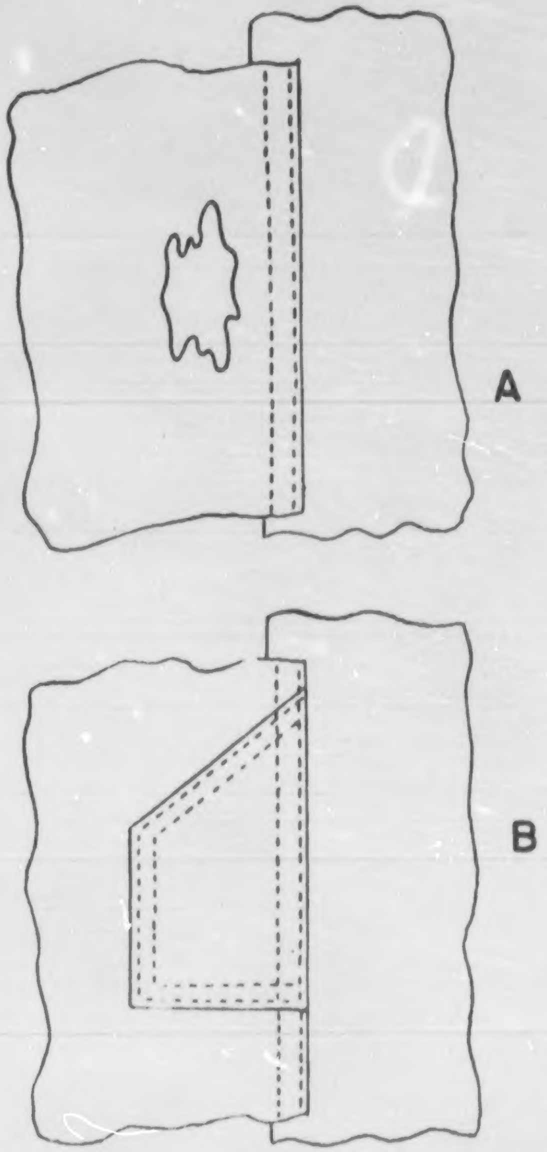


Figure 10-8. Watershed patch at seam top ply.

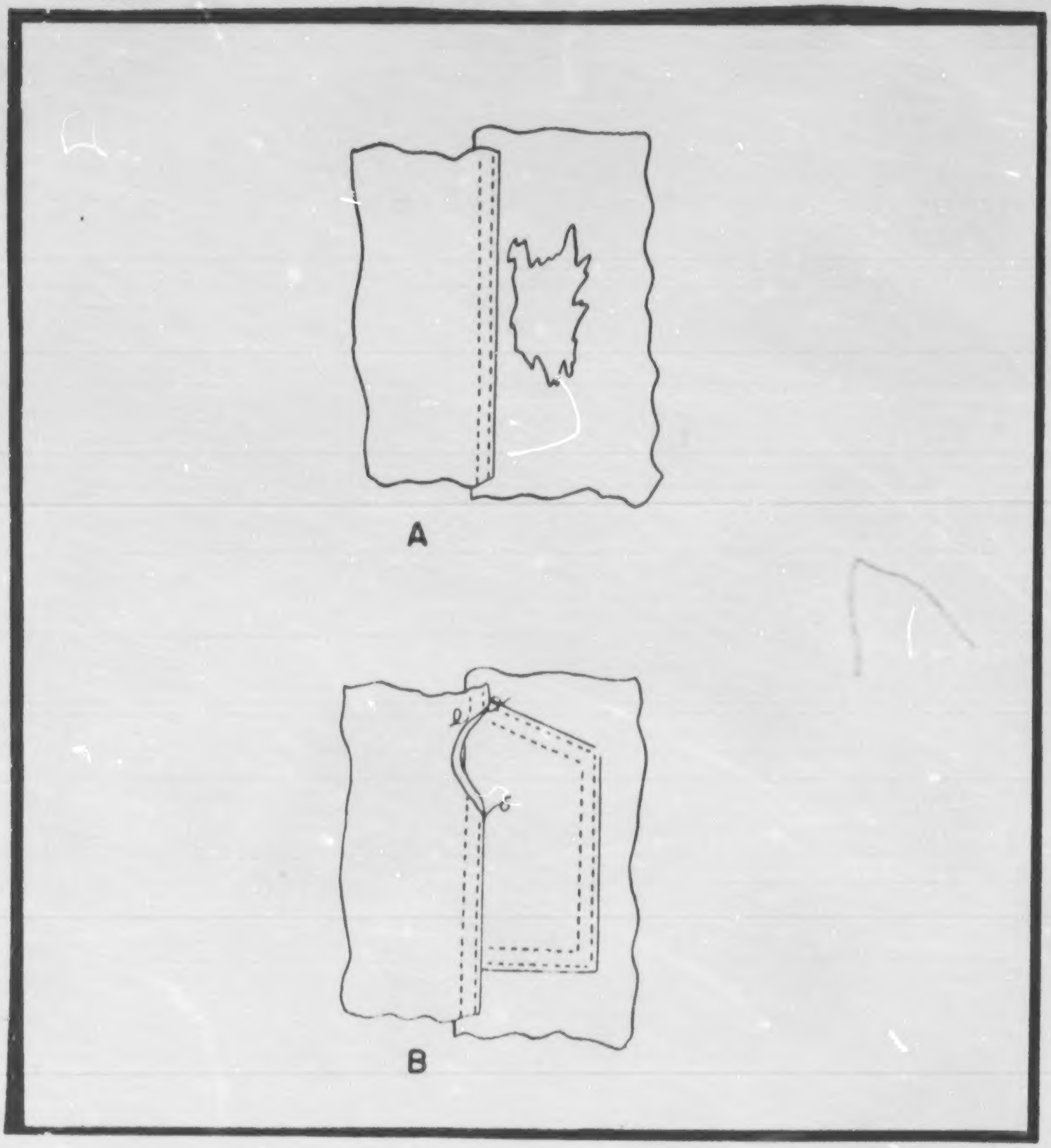


Figure 10-9. Watershed patch at seam bottom ply.

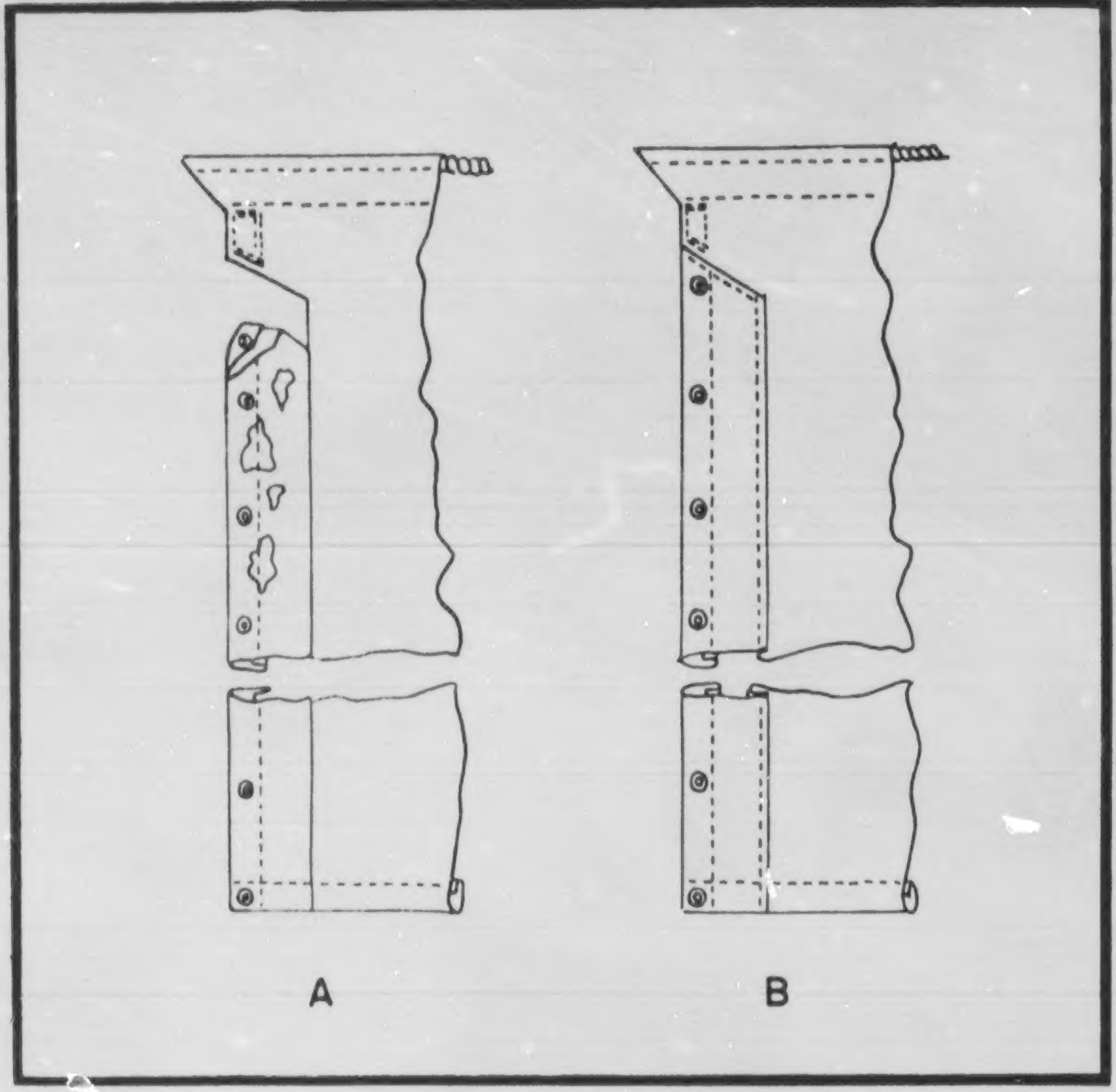


Figure 10-10. Patch for partial replacement of snap fasteners or grommet lugs.

1035

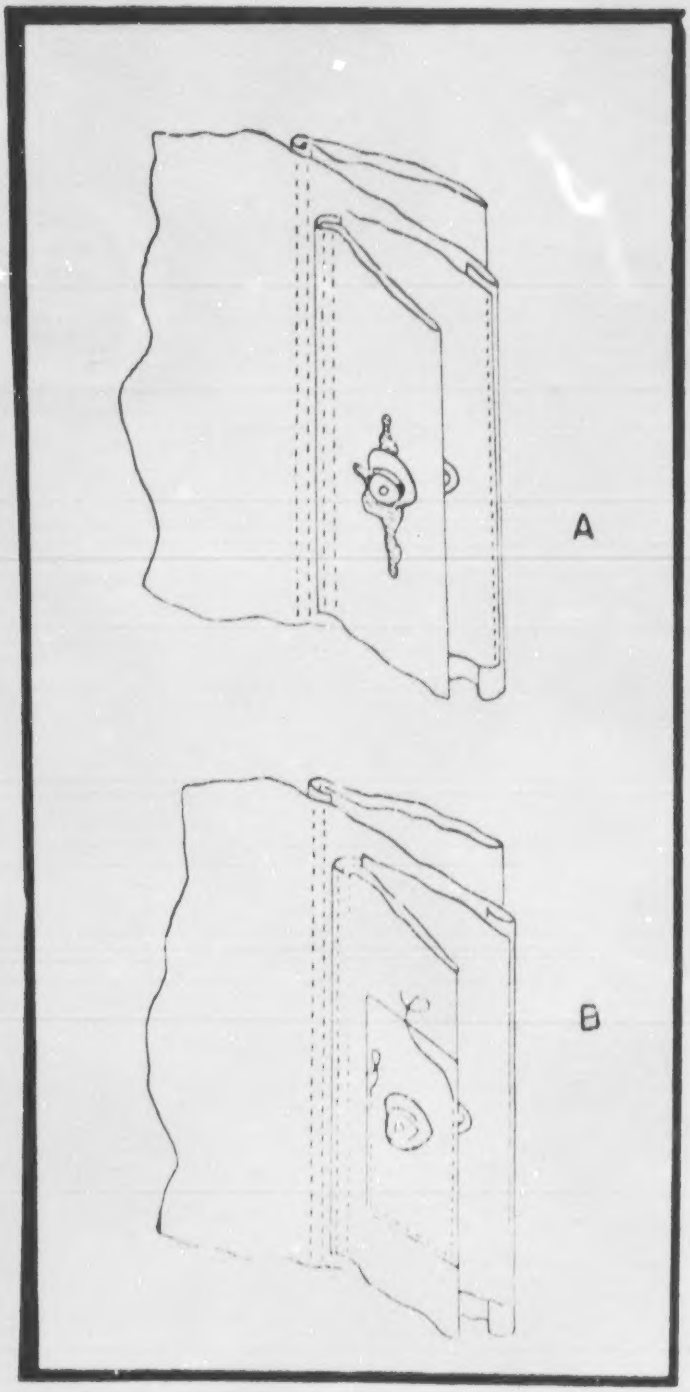


Figure 10-11. Patch for replacing snap fasteners.

g. Repairing or replacing screens. Repair screens of improper size by increasing or decreasing the panels. Remove and restitch sod cloths and splash curtains that have caused distortion to the screens. Patch or remove defective screening, and replace it with M-1945, command-post end or sidewall screen as appropriate. Patch screens on the outside with not less than one-half inch overlap around the entire perimeter of the opening. Make two stich lines on the screen as specified for patches on the tent body, but do not turn under the materials. Put no more than six patches on any one screen panel, and patch no more than one-quarter of the area of a single panel. Replace screens that require more patching than specified above.

h. Repairing or replacing hardware. Repair or replace grommets, snap fasteners, or rings as follows:

(1) Grommets and snap fasteners. Replace all lose, missing, badly split, corroded, and off-center grommets and snap fasteners. Patch enlarged grommet or snap-fastener holes by using a double thickness patch, one thickness over the damaged area and one under it. When a series of grommets or snap fasteners must be replaced, as in a wall section, remove the damaged area in which they are inserted by cutting out the hem. Sew in a new, serviceable hem, and replace the hardware. Insure that grommets and snap fasteners are properly set, without cutting the material. Form the hole for the male part of the fastener when driving the fastener into the material. Insure that the holes are no longer than those made with a No. 10, round drive punch for 5/16-inch holes. Punch holes in the duck, to receive the grommets, that are smaller than the outside diameter of the grommet barrel, thus insuring that the barrel is forced through the hold.

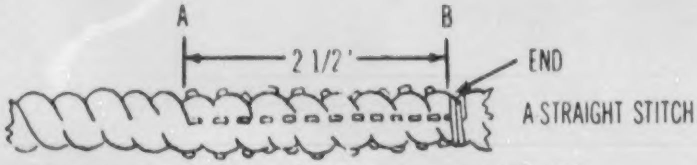
(2) Repairing or replacing rings. Replace defective rings that have previously been used in the place of grommets, with new grommets. If the hole is so enlarged that a grommet will not fit, patch the hole with a double thickness patch, and insert a grommet in the patched hold. Replace defective 3/4-inch rings used on the drip cap. Replace D-rings in like manner.

i. Repairing and replacing lines. Cut off frayed ends of damaged lines, and repair the lines by hand whipping or machine stitching. (Machine stitching is preferable.) Remove no more than 4 inches in making such repair. Replace damaged lines that cannot be repaired and mildewed lines. When repairing lines by hand sewing, insure that wrapping twine is well waxed with beeswax. Replace damaged or missing foot stops in the manner specified for lines. Figure 10-12 shows repairs to tent lines.

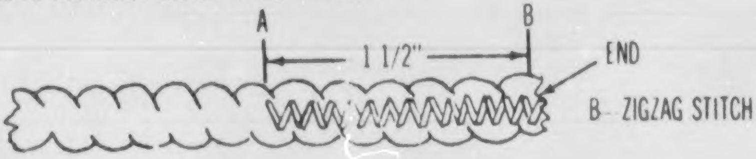
j. Re-treating. After completing repairs of tents or components, re-treat all areas except the liner, if they require re-treatment, with fire-, water-, weather-, and mildew-resistant re-treatment compound. Use water and mildew solvent, textile-preservative compound for re-treating the liner. Brush or spray the re-treating compounds.

k. Fabricating label. Fabricate a label for the repaired tent. Construct the label from appropriate cloth, and print on the label with indelible ink in bold, black type, one-quarter inch high. Make the label 4 1/2 by 4 inches. Place it on the hem over the doorway, and position it adjacent to the manufacturer's label. Print the following on the label: tent nomenclature, Federal stock number, date of completion of the repair, name of the repair installation, and name of the inspector.

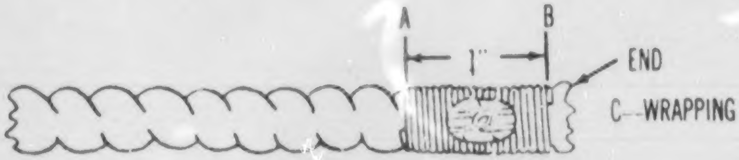
10-4. FINAL INSPECTION. See paragraph 1-4b.


A
B
2 1/2"
END
A-STRAIGHT STITCH

END SHALL BE MACHINE STITCHED FROM "A" TO "B," WRAP AROUND LINE 2-1/4 TURNS AND STITCH BACK TO "A." STITCHING TO BE DONE WITH NO. 8-6 CORD THREAD, COTTON, HEAVY, TYPE 301 STITCH, 6 STITCHES TO THE INCH, PLUS OR MINUS 1 STITCH.


A
B
1 1/2"
END
B--ZIGZAG STITCH

END SHALL BE MACHINE STITCHED WITH NO. 24-4 COTTON MACHINE THREAD, OVERCAST STITCH, TYPE 304, 14 STITCHES TO THE INCH, PLUS OR MINUS 2 STITCHES.


A
B
1"
END
C--WRAPPING

HANDWHIPPING SHALL BE DONE WITH 1 STRAND OF 5-PLY WRAPPING TWINE WELL WAXED.

Figure 10-12. Repaired tent lines.

SECTION XI

REPLACEMENT OF DAMAGED STOVEPIPE OPENINGS

11-1 GENERAL. Many tents have been processed through property disposal channels, that is, treated as scrap, because of damaged stovepipe openings. These tents could have been made serviceable by making the appropriate repairs according to the instructions contained in this section. Wherever possible, it is desirable to replace a damaged stovepipe with a new modified rubberized stovepipe opening (sec. XII); however, since tents equipped with the modified openings are comparatively new, it is not always possible to obtain a new opening from a salvaged tent, and the repairman must then fabricate a new opening with the materials at hand.

11-2 PRECAUTIONS. The student should mark all measurements on replacement material before he begins to fold and stitch the material. However, prior marking can be done only after he thoroughly understands all procedures for making the stovepipe opening. Prior marking is done because the replacement material can be flattened out and measured accurately; otherwise, it would pucker during the folding and stitching process, and accurate measurements could not then be obtained. But, for the sake of clarity, marking is described in sequence in this text.

11-3. REPAIR MATERIALS. The following materials should be in accordance with paragraph 1-3: tape, thread, and webbing.

11-4. REPLACEMENT PROCEDURES. The method of cutting the damaged opening (from panel seam to panel seam) and sewing the replacement opening to the vent is similar to making the seam-to-seam patch. These procedures include squaring the damaged area, opening the seams, constructing the patch, folding the patch, inserting the patch into the seams, and stitching the patch.

Note. The student should observe that the measurements given for the size of the stovepipe opening patch are used for example only; the size of this patch is actually determined by the area of the damage. In cutting the material for a specific damaged area, the panel material must be 1 1/2 inches larger on all sides than the damaged area cut away. This allows 1 inch for each seam and one-half inch for turning under. In all other respects, (folding, stitch measurements, etc.) the instructions given apply.

a. Squaring the damaged area. Square the damaged opening from seam to seam, 2 inches above and below the reinforcement stitches.

b. Opening the seams. Open the seams within the squared area, and cut out the damaged panel on the mark used to square the panel.

c. Constructing the patch. (Before following these instructions, see the note above, and adapt these instructions accordingly.) Construct the patch (fig. 11-1) as follows:

(1) Select two pieces of material having the same weight and texture. Cut each piece of material evenly to a 12- by 12-inch square.

(2) Measure and mark the material in such a manner as to locate the center (A).

(3) Measure and mark the material for the stovepipe opening. From the center point, measure and mark up 4 1/4 inches and down 4 1/4 inches; then measure and mark left and right from center 3 1/4 inches (B). Draw all sides to the appropriate measurements. Lines must be straight and evenly applied to the material.

(4) Stitch the two pieces of material together (C), making certain the materials are squarely positioned with edges and corners alined. Insure that the stitch line follows the markings made for the stovepipe opening.

(5) Stitch around the markings to the starting point and 1 inch beyond to form a tack stitch (D). Make the tack stitch no less than seven-eighths of an inch nor greater than 1 1/8 inches.

(6) Cut out the center of the material one-eighth of an inch from the stitch line (E). Do not cut nearer than one-eighth inch from the stitch line because too narrow a border would weaken the seam.

(7) Turn the top ply material through the opening (F).

(8) Roll or pull out the top ply material as much as possible, and press it down as much as possible to maintain its position (G).

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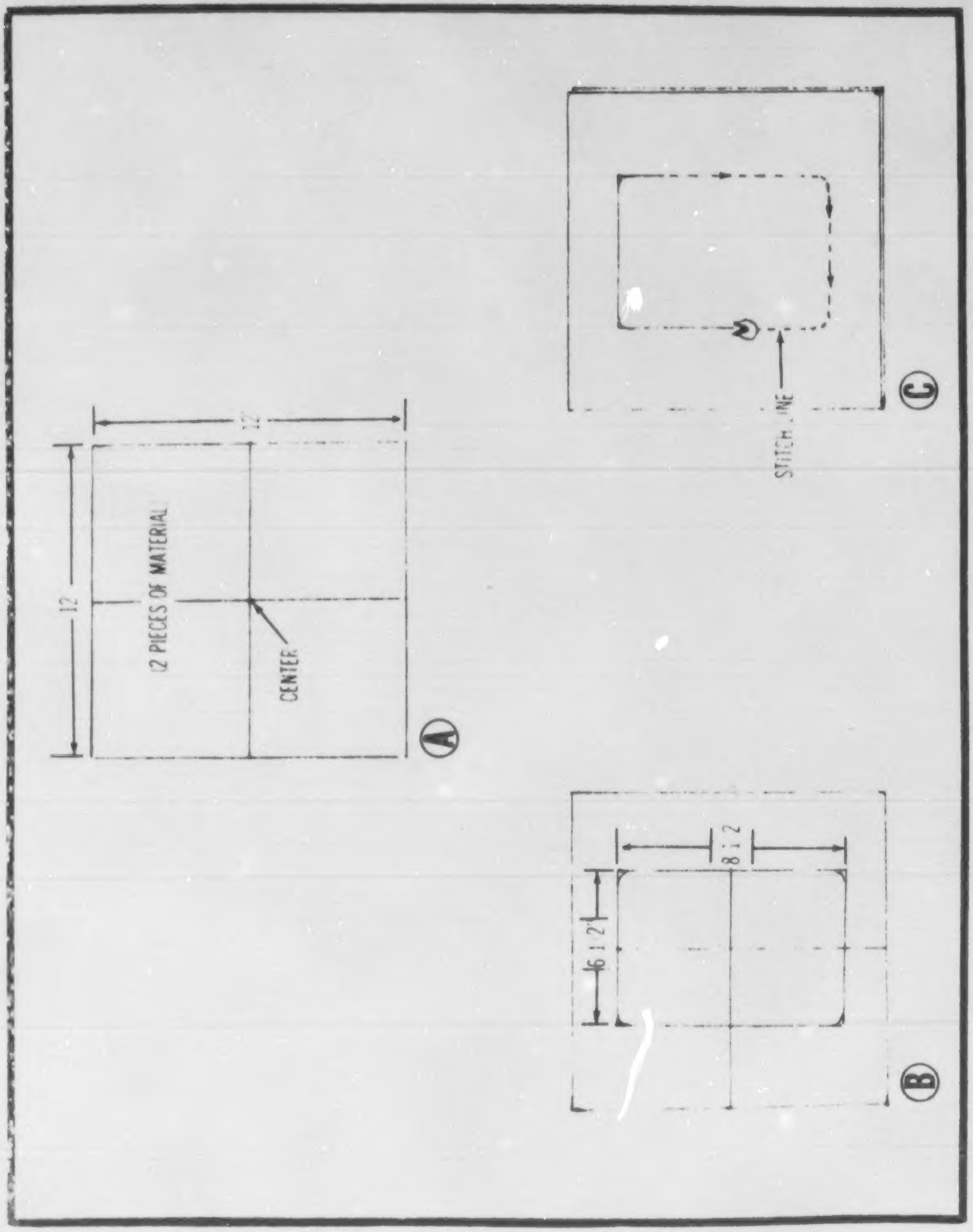
12
12
(2 PIECES OF MATERIAL)
CENTER
A
8 1/2
6 1/2
B
STITCH LINE
C

Figure 11-1. Replacement of stovepipe opening.

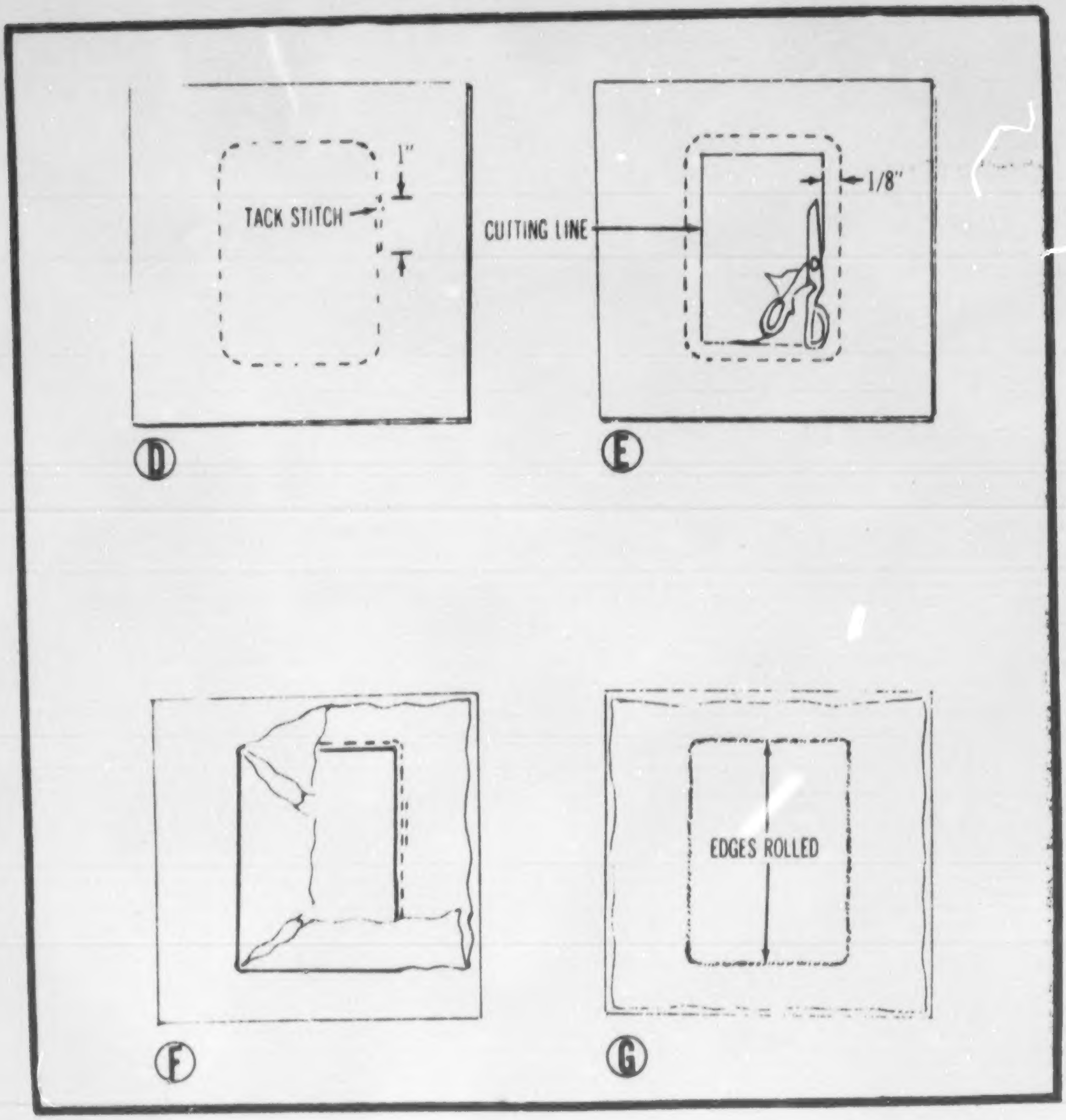
1"
TACK STITCH
CUTTING LINE
1/8"
D
E
EDGES ROLLED
F
G

Figure 11 -1 (Continued)

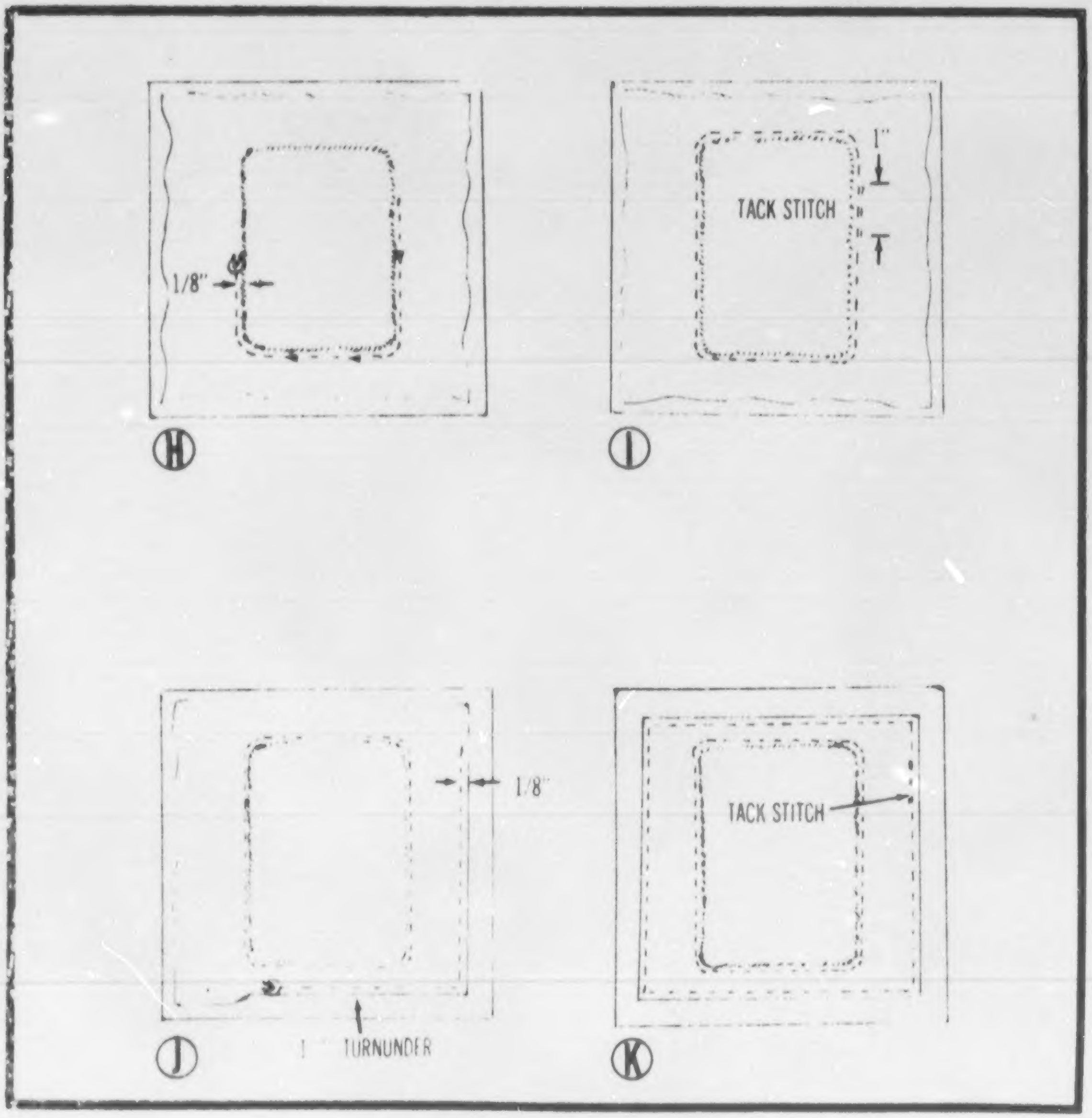
1/8"
H
TACK STITCH
1"
I
1/8"
J
1" TURNUNDER
TACK STITCH
K

Figure 11-1 (Continued)

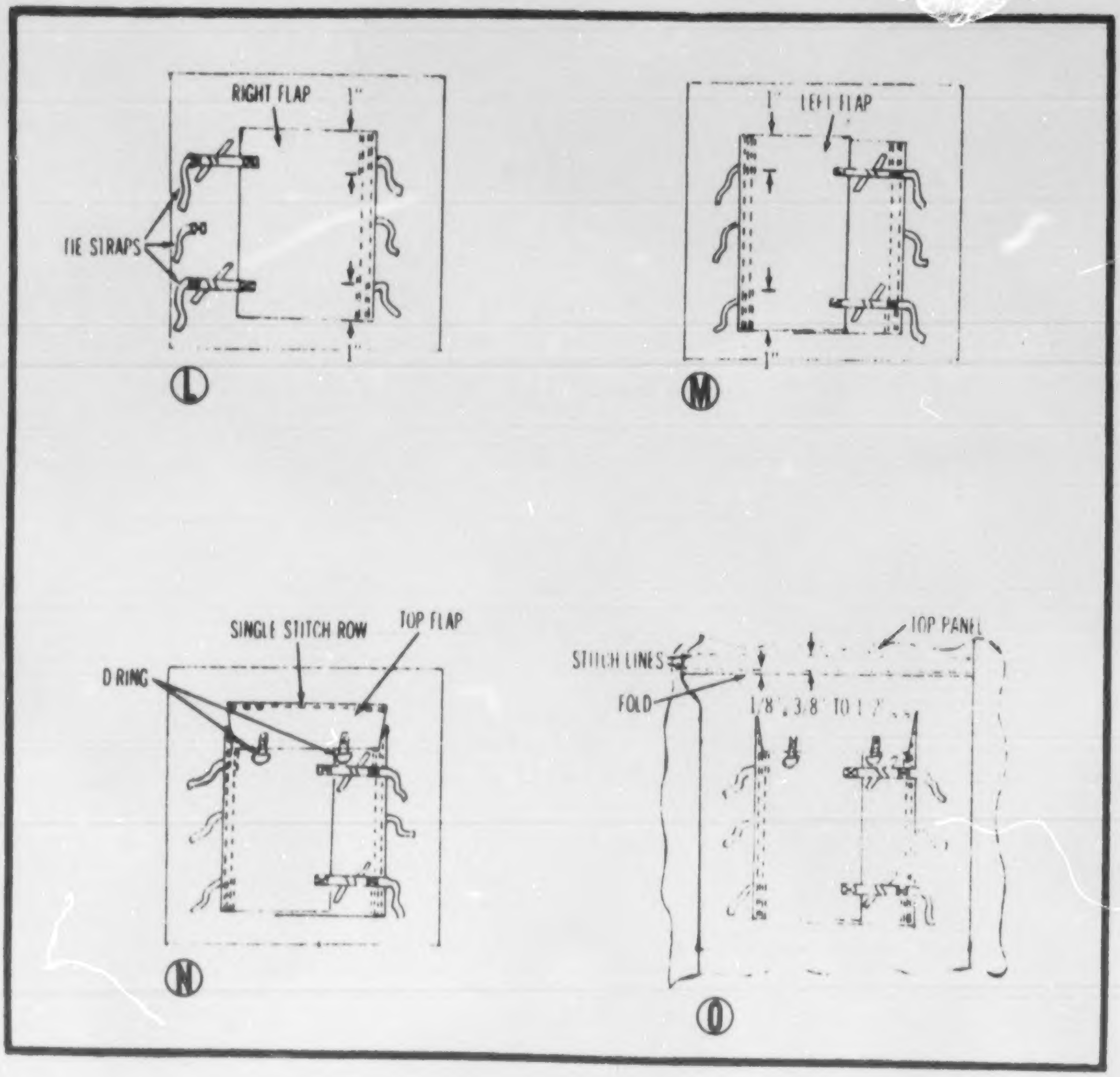
RIGHT FLAP
1"
TIE STRAPS
1"
L
1"
LEFT FLAP
1"
M
SINGLE STITCH ROW
TOP FLAP
D RING
N
STITCH LINES
TOP PANEL
FOLD
1/8", 3/8" TO 1 1/2"
O

Figure 11-1 (Continued)

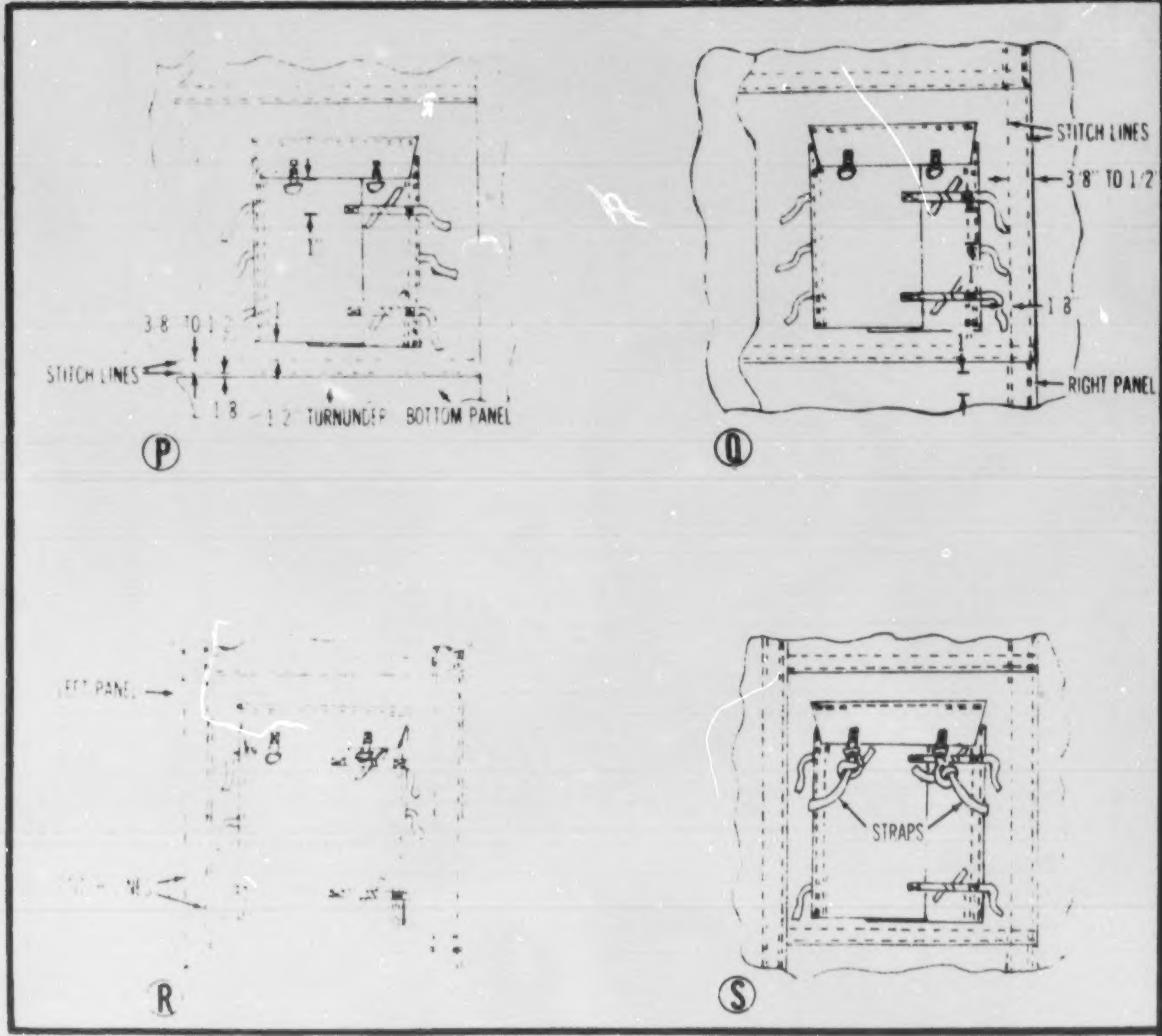
3/8" TO 1/2"
STITCH LINES
1/8"
1/2" TURNUNDER
BOTTOM PANEL
1"
P
STITCH LINES
3/8" TO 1/2"
1/8"
1"
RIGHT PANEL
Q
LEFT PANEL
STITCH LINES
R
STRAPS
S

Figure 11-: (Continued)

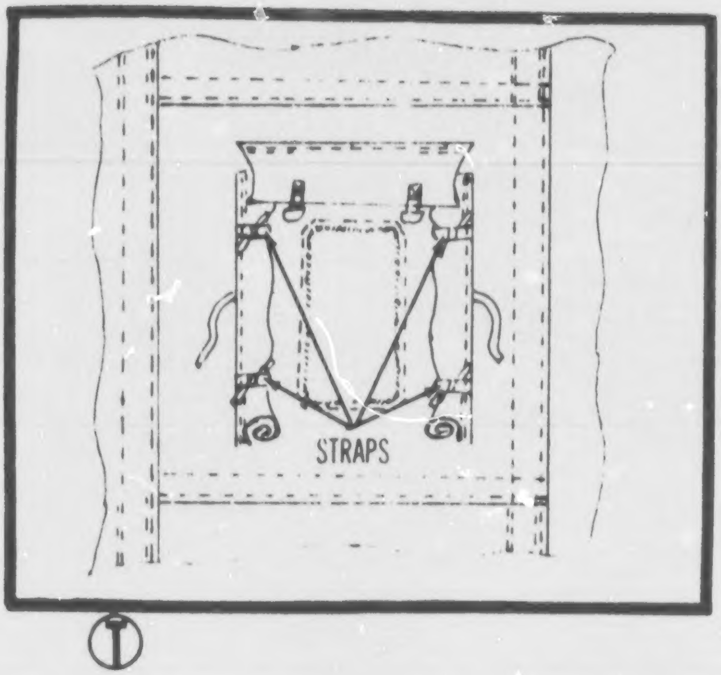

Figure 11-1 (Continued)

(9) Stitch around the stovepipe opening one-eighth of an inch from the rolled edges (H). Start at the right side of the opening.

(10) Apply the stitch around the entire opening to the starting point and 1 inch beyond (I) to secure it with a tack stitch as in (5) above.

(11) Fold the top reinforcement piece under one-half inch at the edges. Stitch one-eighth inch from the folded edges. Start the stitch line at the right side of the material (J), and continue around the material and 1 inch beyond the starting point to secure it with a tack stitch as in (5) above. The stitch line must be straight and evenly spaced around all folded edges of the material (K).

d. Replacing flaps. Replace the stovepipe flaps of the tent, on to the fabricated stovepipe opening as follows:

(1) Attach the right stovepipe flap over the stovepipe opening with a double row of stitches. Follow the old stitch lines, making certain the flap is alined over the opening and is properly secured with a tack stitch (L) as in c(5) above.

(2) Attach the left flap over the stovepipe opening (M) in the same way as in (1) above.

(3) Attach the top flap over the left and right flaps, and insure that the top flap is centered over the opening. Stitch the flap in position with a single row of stitches following the old stitch line and secure it with a tack stitch at each end (N) as in c(5) above.

e. Replacing the stovepipe opening in the panel. Insert the stovepipe opening into the panel as follows:

(1) Position and stitch the reinforced stovepipe opening under the top panel with a double row of stitches, one-eighth inch from the folded edge and three-eighths to one-half inch apart. Make the stitch lines straight and evenly spaced (O).

(2) Position and place the bottom edge of the reinforced opening over the bottom panel. Fold the edge under one-half inch, and stitch one-eighth inch from the folded edge. Apply the second stitch row three-eighths to one-half inch from the first stitch line. Make the stitch lines straight and evenly spaced (P).

(3) Position and stitch the stovepipe opening to the right panel with a double row of stitches, one-eighth inch from the edge and three-eighths to one-half inch apart. Make the stitch lines straight and evenly spaced, and secure the ends of the stitch lines with a tack stitch (Q) as in c(5) above.

(4) Position and stitch the stovepipe opening to the left panel (R) in the same way as in (3) above.

(5) See figure 11-1 (S) and (T) for position of straps and flaps in closed and open positions.

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SECTION XII

REPLACEMENT OF DAMAGED STOVEPIPE OPENING WITH MODIFIED STOVEPIPE OPENING

12-1. GENERAL. Late models of the general-purpose tents are equipped with a rubberized, fire-resistant modified stovepipe opening. When older issues of these tents have damaged stovepipe openings, the openings are replaced with the modified type, when available. Since these modified openings are not items of issue, they must be obtained from tents that are no longer serviceable. Tent liners must also be modified to accommodate the modified openings.

12-2. MATERIAL REQUIRED FOR REPLACEMENT. The materials needed to install a modified stovepipe opening include tape, thread, and webbing, which should be in accordance with paragraph 1-3.

12-3. MODIFICATION PROCEDURES. Procedures for installing the modified stovepipe opening include cutting and resewing stitching, inserting tie tapes, increasing the size of the existing stovepipe opening in the tent and tent liner, and modifying the tent liner. These procedures are described below.

a. Modifying the tent and installing the modified stovepipe opening. Determine the center of the new stovepipe opening by measuring about 25 1/2 inches from the eave line and about 17 1/2 inches from the ridge line (fig. 12-1). Draw two intersecting lines from these two measurements. The point of intersection is the center for the opening. Cut the stitching, and remove the old-type stovepipe opening from the tent. Increase the size of the existing round stovepipe-opening hole in the tent to a 15 inch-square opening, cut the tent an additional one-half inch at the corners, and fold back the canvas one-half inch, leaving a 16-inch hole. Place the modified stovepipe opening on the inside of the tent, center it around the hole, and stitch 1-inch webbing folded in half around the perimeter of the stovepipe opening with a double row of stitches, locked at one end. Cut the webbing at the corners and at the centers, and insert eight tie tapes, as shown in figure 12-2. Restitch the webbing over the tie tapes, and secure this stitching with a 1 1/2-inch tack stitch.

b. Modifying the tent liner. Increase the opening in the tent liner to a 15-inch square opening and cut the corners one-half inch, turning the edges toward the outside (fig. 12-2). Position eight tie tapes on the outside

1050

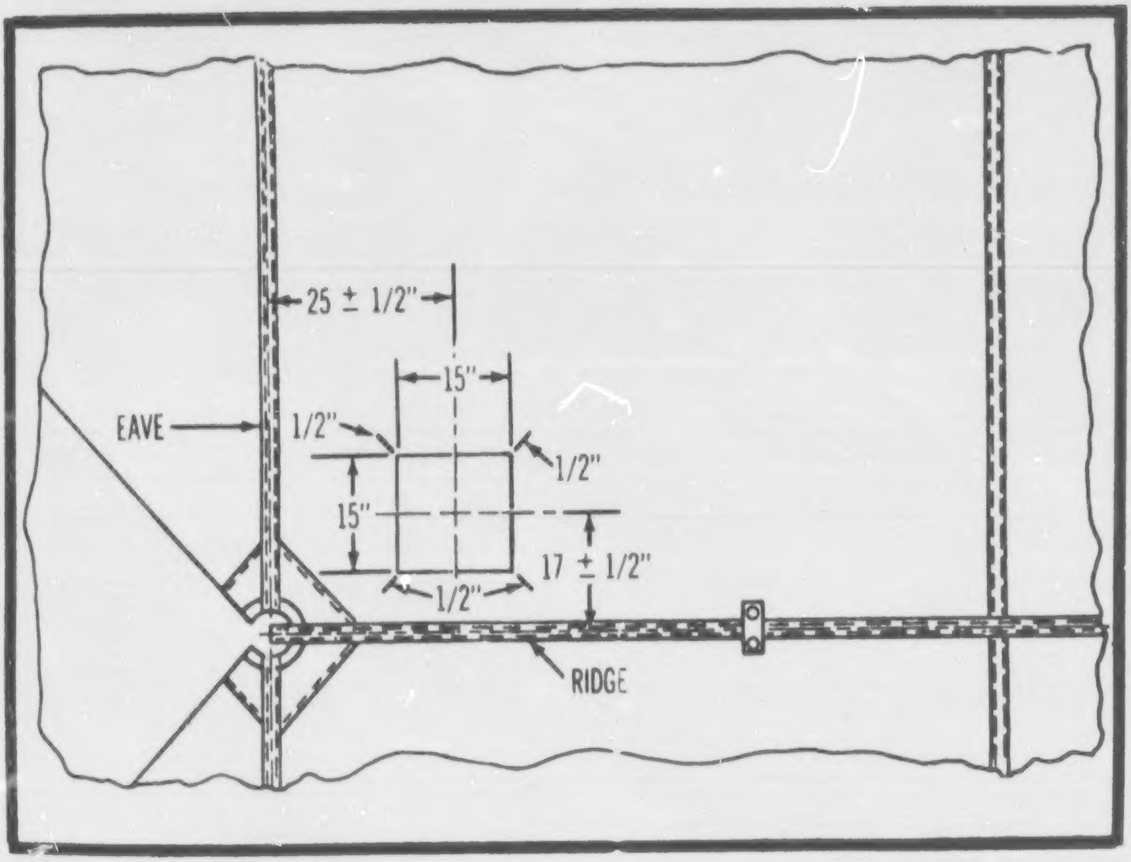
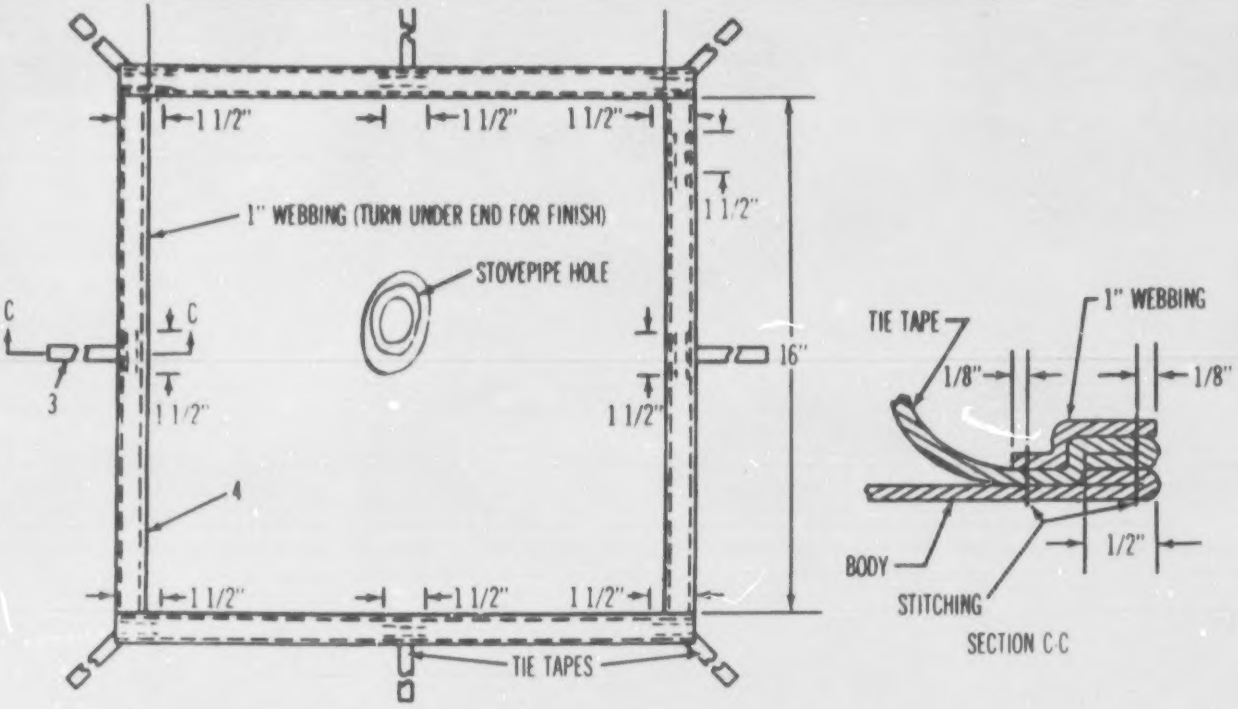

25 ± 1/2"
15"
EAVE
1/2"
1/2"
15"
17 ± 1/2"
1/2"
RIDGE

Figure 12-1. Diagram for enlarging existing stovepipe opening in tent.


1 1/2"
1 1/2"
1 1/2"
1" WEBBING (TURN UNDER END FOR FINISH)
STOVEPIPE HOLE
C
C
3
1 1/2"
1 1/2"
1 1/2"
16"
4
1 1/2"
1 1/2"
1 1/2"
TIE TAPES
TIE TAPE
1" WEBBING
1/8"
1/8"
1/2"
BODY
STITCHING
SECTION C-C

OUTSIDE VIEW OF STOVEPIPE OPENING

Figure 12-2. Tent liner modified with webbing and tie tapes in place.

of the tent liner to match with the tie tapes sewn to the tent. Turn under the ends of the tie tapes where they are positioned on the liner. Place webbing on the outside of the tent liner over the tie tapes and all around the edges of the liner opening. Sew the webbing and the tie tapes in place. To keep the tent liner from shifting and coming in contact with the stovepipe, tie the tie tapes of the liner to the matching tapes of the tent. Figure 12-3 shows the modified stovepipe opening installed.

c. Recording the modification. Report the modification to the tent in accordance with the procedures in TM 38-750, the Army Maintenance Management Systems (TAMMS).

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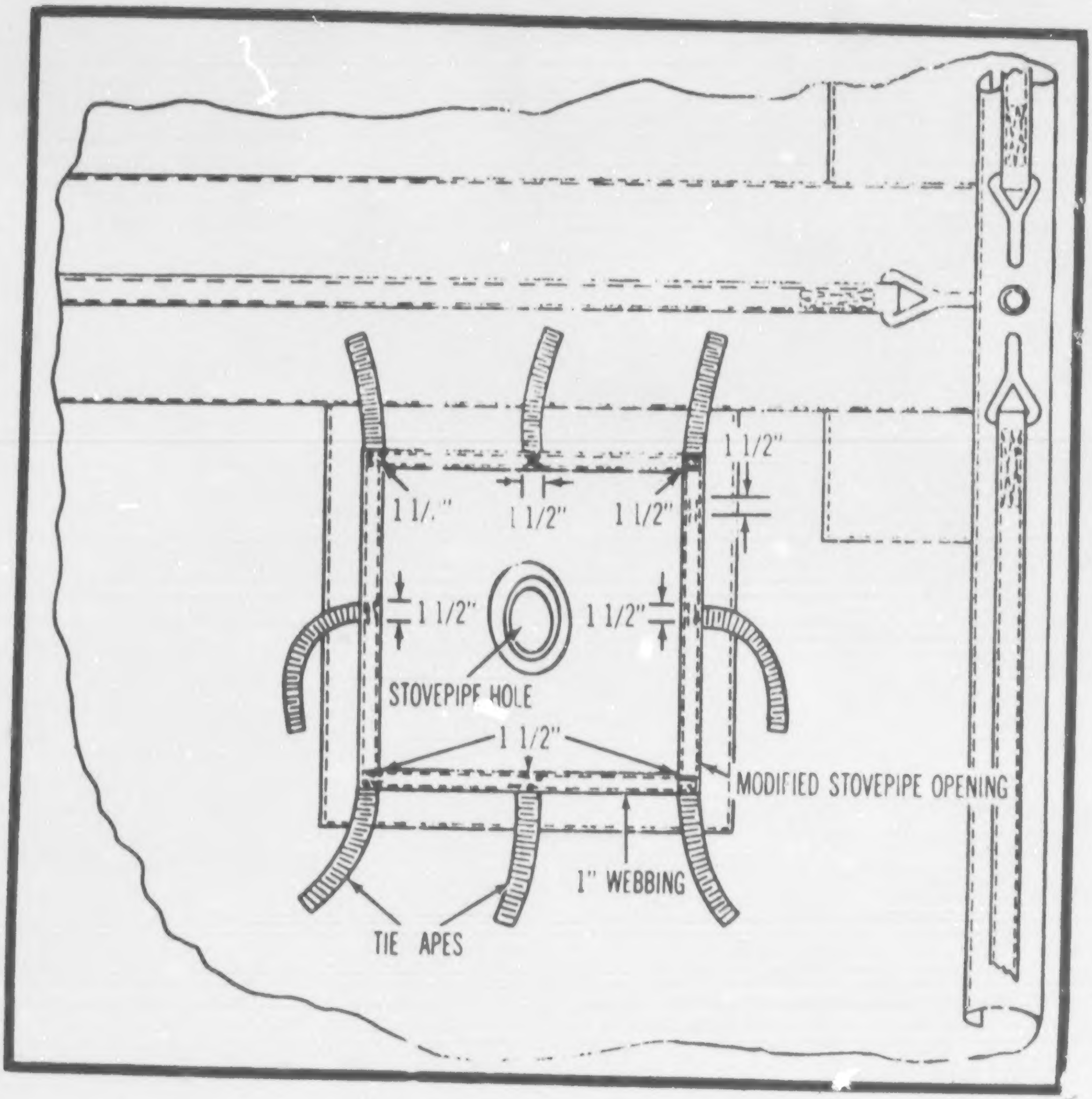
1 1/2"
1 1/2"
1 1/2"
1 1/2"
1 1/2"
1 1/2"
STOVEPIPE HOLE
1 1/2"
MODIFIED STOVEPIPE OPENING
1" WEBBING
TIE APES

Figure 12-3. Modified stovepipe opening installed.

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QMS 200.1WB1

STUDENT WORKBOOK

PART I

CLOTHING AND TEXTILE REPAIR

U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

SUPPLY TRAINING CENTER OF THE ARMY SCHOOL SYSTEM

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U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

SECTION I

INTRODUCTION TO CLOTHING AND TEXTILE REPAIR

ORIENTATION SHEET

1. Objective

The purpose of this course is to provide a working knowledge of maintenance in the field, ROAD and COSTAR concepts, organization for maintenance in the field, occupational specialty 43J20 in support of maintenance in the field, inspecting, marking, classifying, measuring, resizing, and fitting of clothing, and the application of these skills in support of civic activities in counterinsurgency situations.

2. Standards of Attainment

As a result of this instruction, the student, given new and used clothing, appropriate references, tools, equipment, and supplies, will be able to inspect clothing for defects and mark such defects with appropriate symbols; given items of clothing with marked defects, serviceability standards, and repairability standards, indicate proper classification of each garment; given altered clothing, sizing chart, and folding guide, the student will resize and fold garment for return to stock for reissue; given measurements appropriate to each clothing size, measure a model to determine the appropriate clothing size; and be able to relate at least 3 different types of services which he, as a textile repairman, may perform to support civil affairs operations in a counterinsurgency situation.

3. Relationship to Other Subcourses

These subcourses are directly related to all other courses in which a knowledge of clothing and textile repair is necessary. They are directly related to reclamation and maintenance courses where the student will be working with or repairing clothing and textile items.

NOTE: SECTION 2 HAS BEEN OMITTED DUE TO MILITARY SPECIFIC MATERIALS.

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SECTION III

INSPECTING AND MARKING OF CLOTHING DEFECTS

PRECIS

I. Introduction

A. Orientation and Motivation During this period of instruction, the instructor will discuss inspection and marking of clothing defects to include symbols used in marking defects. Also he will give a demonstration (step-by-step) in the correct procedures used in inspecting clothing for defects. After the demonstration the student will perform a practical exercise practicing how to inspect and mark defected clothing.

B. Objective As a result of this instruction, the student, given appropriate references, tailor's chalk, defect marking symbol guide, and three items of used clothing, will be able to inspect clothing systematically and locate all defects; using tailor's chalk, will mark each defect found, with the appropriate marking symbol.

II. Presentation

A. Purpose of Inspection of Clothing

1. To determine whether a garment is in a condition for reissue or if it is in need of repairs.

2. To make sure that all defects are correctly marked so that all repairs can be made.

B. Definition of defect marking - A system for marking defects in garments and textiles to avoid any possible misunderstanding between the inspector and the repairman.

C. Purpose of defect marking - To facilitate an exact understanding between the inspector and the repairman.

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INSPECTING AND MARKING OF CLOTHING DEFECTS

HOME STUDY PRACTICAL EXERCISE

I. Introduction

A. Listed below you will find the definition of the different defect marking symbols. Draw the appropriate symbol in the space provided beside each definition.

1. Draw the symbol used to indicate any portion of a garment which is too short. ______________

2. Draw the symbol used to indicate that the seam involved should be let out to that extent. ______________

3. Draw the symbol that indicates the need to take a seam in.

____

4. Draw the symbol that indicates that a part of a garment is too long. ______________

5. Draw the symbol for a general defect, such as open seams or skipped stitches. ______________

6. Draw the symbol used to indicate a hidden defect. ____________

7. Draw the symbol used to indicate a missing button and the location of that button. ______________

8. Draw the symbol used to indicate a missing buttonhole.

____

B. Listed below you will find the definitions of each of the four "letter" symbols in the space provided beside each definition.

1. This symbol is used when a piece of patching material is pinned or basted to a garment and sent to a repairman. ____________

2. This symbol is used to indicate that a small hole needs to be darned. __________

3. This symbol is used to indicate that a component part of a garment, such as a collar or cuff, needs to be replaced. ______________

4. This symbol is used to indicate that a piece of material must be added to a particular part of a garment in order to extend that part.

____

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INSPECTION AND MARKING OF CLOTHING DEFECTS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the student will receive a thorough grounding of the correct procedures used in inspecting and marking and symbols used in inspecting and marking of clothing for defects.

II. Study Reference: **TM 10-267, Page 3, Figure 1.**

III. Supplies, Tools and Equipment Required

Shirts and Trousers (ample supply)

Tailor's chalk (ample supply)

Pins (ample supply)

Colored Chalk (ample supply)

IV. Direction to the Student

Follow the step-by-step procedures outlined in paragraph B. If you have any questions regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A Par VI) set up to be used following the job breakdown is to enable the instructor in checking the student performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the student in the breakdown "B" below are as follows:

1. Is student following sequence listed in the production steps?

2. Is the student inspecting the garments as described in the key points?

3. Is the student working rapidly and efficiently with a minimum of lost time?

4. Is the student giving each garment an overall check to find any unusual damages or defects?

B. The procedures for inspecting and marking defected clothing are listed to the left of the page in the breakdown below. The key points which correspond in numbers to the procedures for each breakdown are listed to the right of the page.

Routine for Inspecting Shirts

1. Inspect entire top collar.	1. a. Make sure the shirt is laid flat, front up. b. In order to assure complete inspection of the top collar, turn back portion of top collar upward.
2. Inspect under-collar.	2. Make sure that the collar is turned "up" so as to make the entire under-collar visible at a single glance.
3. Inspect under-collar stand.	3. Make sure that the entire collar is laid out flat against the table in order to expose the entire under-collar stand at a single glance.
4. Inspect top collar stand.	4. Make sure that top collar is laid out flat, and folded over on the

	shirt.
5. Inspect entire right front.	5. a. Make certain that you start your visual check at the right front. b. Make sure that you cover all attached component parts (pocket flap, pocket, button on pockets, right front facing and hem at bottom shirt) as you glance down the entire front.
6. Inspect entire left front.	6. Same as key points under step #5, except substitute "Center pleat" for right front facing.
7. Inspect right shoulder seam and epaulets.	7. a. Make certain that you start your inspection at the point where the shoulder seam meets the collar stand and where it joins the armhole seam. b. At the same time thoroughly check the epaulets.
8. Inspect right front armhole sleeve to cuffs.	8. a. Make certain that you check the now visible portion of armhole.

	b. Make certain that you cover the entire sleeve from the armhole seam to, and including, the cuff with a single sweep of the eye.
9. Same as step #7, only on left shoulder seam and epaulet.	9. Same as key points under production step #8.
10. Same as step #8, only on left armhole, sleeve to cuff.	10. Same as key points under production step #8
11. Turn shirt over.	11. Have back up and sleeves extended.
12. Inspect yoke.	12. Make sure that you start at the extreme left edge of yoke and glance along the entire yoke to end.
13. Inspect entire back.	13. In order to assure thorough inspection, start at top of back to, and including, hem at bottom.
14. Inspect right side seam, including sleeve.	14. a. Make sure that you start at the point where the right side seam meets the sleeve and armhole seams, and continue down through the gusset. b. Same as key points #1 and 2, step #8 except as applied to back portion of armhole seam, sleeve and cuff.

15. Inspect left side seam, including sleeve.	15. Same as key points #1 and 2, step #13, except as applied to left side seam and sleeve.

Routine for Inspecting Trousers

1. Lay trousers out flat.	1. Have legs together, right side up and fly to the right.
2. Inspect the right fly.	2. Make sure that when checking the right fly, top to bottom, you also cover the fly bottoms.
3. Inspect the right fly lining.	3. In order to facilitate this step, turn the right fly back on the trousers exposing the fly lining.
4. Inspect the waistband.	4. Make certain that you check the entire waistband by opening the fly and glancing from right fly to left fly around the whole waistband.
5. Inspect belt loops on right side of trousers.	5. In order to check these belt loops easily and rapidly, close the fly and glance along the top of the waist from the left to the right edge of the trousers.
6. Inspect right hip pocket lining.	6. Make sure that you turn the lining inside out so as to expose

	it to a rapid inspection.
7. Inspect right hip pocket facings.	7. In order to facilitate inspection of these parts, leave the pocket lining turned inside out.
8. Inspect entire watch pocket.	8. a. Make certain that the pocket lining is pulled out and checked. b. Make sure that you cover the two watch pocket facings.
9. Inspect right side pocket lining.	9. Same as key point #1, step #5.
10. Inspect right side pocket facing and bearer.	10. Same as key point #1, step #6.
11. Inspect outside right portion of leg.	11. a. Make certain to start at the top of the waist and glance down the entire surface of leg. b. Make sure that you check the outseam. c. Make sure that you check the trouser bottom, for frayed edge or loose cross stitching.
12. Open legs of trousers.	
13. Inspect entire inside portion of right leg.	13. a. Make certain to start at the crotch and glance down and over entire surface of leg.

	b. Make sure that you check the inseam.
14. Inspect the seat.	14. a. Check the seat seam. b. Check the body of the material for strength if it is threadbare.
15. Inspect the crotch.	15. a. Check the bar tack where the crotch seam joins the fly. b. Check the meeting point of the two inseams, the seat seam and the crotch seam.
16. Inspect entire inside portion of left leg.	16. Same as key points #1 and 2, step #13.
17. Close legs of trousers.	17. Turn over, left side up.
18. Inspect the entire left fly.	18. a. Make sure that when checking the left fly, you cover the fly front first. b. In order to speed up inspection, open the fly and check the two left fly linings and the buttonholes.
19. Inspect belt loops on left side of trousers.	19. Same as key point #1, step #5 except as applied to left of trousers.

20.	Inspect entire left hip pocket, both lining and facings.	20.	Same as key point #1, steps #6 and 7 combined. However, this is on the left side.
21.	Inspect entire left side pocket, including lining of left leg.	21.	Same as key point #1, steps #6 and 7, except as applied to left side pocket.
22.	Inspect entire outside portion of left leg.	22.	Same as key points #1, 2, and 3, step #11, except as applied to left leg.

SECTION IV

CLASSIFICATION OF CLOTHING

PRECIS

I. Introduction

A. Orientation and Motivation During this period of instruction, the instructor will discuss classification of clothing to include the purpose, definition, and standards of classification. Also, he will give a demonstration of the proper inspection routine for Army service clothing. After the demonstration, the student will perform a practical exercise in classifying Army service shirts and trousers.

B. Objective As a result of this instruction, the student, given appropriate references, will name the standard classification symbols and define each; using those items of clothing previously marked for defects, given tailor's chalk and serviceability standards appropriate for each garment, will mark each garment with the appropriate classification symbol as outlined in the appropriate technical bulletin, and explain why the particular symbol was used.

II. Presentation

A. Definitions of the various classes of Army clothing and equipage items.

1. The classification of army clothing is based on two principles. One is the principle of "serviceability", and the other - the principle of "appearance."

2. The manner in which serviceability and appearance affects the classification of Army clothing are as follows:

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a. In outer dress clothing (Class A uniform) which is observed by the public when worn, appearance is given primary consideration. Serviceability is of secondary importance.

b. In clothing and equipment that does not affect the appearance such as the work uniform and organizational items of equipment, serviceability is the primary factor and appearance is considered secondary.

3. The following are the classification standards governing the classification of Army clothing.

a. N - New.

b. E - Used Reconditioned.

c. O - Used Usable without Repairs.

d. R - Used Repairs Required.

4. A further breakdown of the classification standards are as follows:

a. N-1. New - Excellent. New or unused property in excellent condition ready for use and identical or interchangeable with new items delivered by a manufacturer or normal source of supply.

b. N-2. New - Good. New or unused property in good condition. Does not qualify for N-1 (because slightly shopworn, soiled or similar, but condition does not impair utility).

c. N-3. New - Fair. New or unused property in fair condition. Soiled, shopworn, rusted, deteriorated or damaged and its utility somewhat impaired.

d. N-4. New - Poor. New or unused property so badly broken, soiled, rusted, mildewed, deteriorated, or damaged and its utility is seriously impaired.

e. E-1. Used - Reconditioned - Excellent. Used property, but repaired or renovated and in excellent condition. Retains at least 75 percent wear expectancy of a like new item.

f. E-2. Used - Reconditioned - Good. Used property which has been repaired or renovated and while still in good usable condition, has become worn from further use and cannot qualify for excellent condition. Retains 75 percent wear expectancy of a like new item.

g. E-3. Used - Reconditioned - Fair. Used property which has been repaired or renovated, but has deteriorated since reconditioning and is only in fair condition. Further repairs or renovation required or expected to be needed in the near future.

h. E-4. Used - Reconditioned - Poor. Used property which has been repaired or renovated and is in poor condition from serious deterioration such as from major wear and tear, corrosion, exposure to weather, or mildew.

i. 0-1. Used - Usable without Repairs - Excellent. Property which has been slightly or moderately used, no repairs required, and still in excellent condition. Retains 75% wear expectancy of a like new item.

j. 0-2. Used - Usable - Without Repairs - Good. Used property, more worn than 0-1 but still in good condition with considerable use left before any important repairs would be required. Retains 75% wear expectancy of a like new item.

k. 0-3. Used - Usable Without Repairs - Fair. Used property which is still in fair condition and usable without repairs; however, somewhat deteriorated, with some parts (or portion) worn and should be replaced.

l. 0-4. Used - Usable Without Repairs - Poort. Used property which is still usable without repairs, but in poor condition and undependable or uneconomical in use. Parts badly worn and deteriorated.

m. R-1. Used - Repairs Required - Excellent. Used property, still in excellent condition, but minor repairs required (repairs would not cost more than 10% of standard price).

n. R-2. Used - Repairs Required - Good. Used property, in good condition but considerable repairs required. Estimated cost of repairs would be from 11 to 25% of standard price.

o. R-3. Used - Repairs Required - Fair. Used property, in fair condition but extensive repairs are required. Estimated cost of repair would be from 26 to 40% of standard price.

p. R-4. Used - Repairs Required - Poor. Used property, in poor condition and requiring major repairs. Badly worn, and would still be in doubtful condition of dependability and uneconomical in use if repaired. Estimated repair cost between 41 and 65% of standard price.

q. X - No further value for use as originally intended, but of possible value other than as scrap. Personal property that has some value in excess of its basic material content but which is in such condition that it has no reasonable prospect of use for any purpose as a unit (either by the holding or any other federal agency) is clearly impracticable. Repairs or rehabilitation estimated to cost in excess of 65% of standard price would be considered "clearly impracticable" for purpose of this definition.

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CLASSIFICATION OF CLOTHING

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the student will receive a general knowledge of the correct procedures used in classifying Army service clothing.

II. Supplies, Tools, and Equipment Required

Jackets (Ample Supply)

Shirts (Ample Supply)

Trousers (Ample Supply)

Tags (Ample Supply)

Pencil and Paper (Ample Supply)

III. Directions to Students

A. Follow the step-by-step procedures outlined in paragraph VI B.

B. When in doubt during the practical exercise; call on the instructor for assistance.

IV. Performance Standards **(Refer to AR 32-15)**

The performance standards are established to enable the instructor in checking the student performance and inspecting the final results for grading purposes. (See Par V A.)

V. Job Breakdown

A. The performance standards to be used by the instructor to check student performance are as follows:

1. A garment classified (N) must be without a doubt new and unused.
2. A garment classified (E) has been used and reconditioned.
3. A garment classified (O) has been used and is usable without repairs.

4. A garment classified (R) has been used and is in need of repairs.

5. A garment classified (X) has no further value for use as originally intended but of possible value other than as scrap.

B. The procedures for classifying Army clothing are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page.

1. Record information about garment.	1. a. Garment number. b. Type of garment.
2. Inspect garment.	2. a. Use inspection procedures outlined in "Inspection and Defect Marking" on shirts and trousers. b. For wool coats, overcoats, and other garments, follow a set procedure in a manner similar to above.
3. List defects.	3. Extent of defects and possible corrective measures to restore serviceability.
4. Evaluate and Classify.	4. a. To classify properly, keep in mind the garment type to determine the important factor considered "serviceability" or "appearance". b. Remember the general rule of 75% serviceability remaining in the garment.

C. As a general guide, the following standards will apply in classifying items of the uniform, outer clothing, and individual equipment used by the individual and which affect his appearance. All of these standards must be met before the item can be classified as serviceable and issued.

1. Complete state of repair - All repairs necessary to render the item completely serviceable will have been made.

2. Cleaned - Must be in a clean condition; that is laundered, dry-cleaned, or sterilized.

3. Buttons - Buttons replaced on outer garments, which are visible when such garments are being worn, should be of like size, shape, and color as those buttons originally affixed, or which were predominant on the garment to which the button is affixed. Buttons which are not visible when a garment is being worn need not be specifically of the same color but should be of the same size.

4. Buttonholes - Buttonholes should not be enlarged or ripped.

5. Frayed edges - A frayed edge is one with a ragged appearance because of worn or broken threads. Frayed edges will not be permitted.

6. Linings - Linings in all outer garments must be in a complete state of repair. Repair may include minor patches. The patch does not have to match the color of the lining exactly, but should be reasonably similar.

7. Patches and Darns - Patches and darns which would be visible on outer clothing when worn are not permitted.

8. Pockets - Pockets must be clean and in a complete state of repair. Any repairs will be of a wear expectancy similar to that of the remainder of the garment. Replaced pockets must be of a size consistent with those originally in the garment.

9. Belt Loops - All belt loops on trousers will be the same as on any new garment of a like make, including shade, material, and number.

10. Fading - Except for those items designated as "utility" garments, fading in any obvious degree will not be permitted. Fading which does not cause conspicuous deviation from original shade will be permitted in "utility" garments.

11. Insignia Marks - Chevron, oversea service bar, organizational shoulder patch, or other insignia marks, caused by fading or discoloration, will prohibit serviceable classification.

12. Identification Marks - Usual marks of identification that are found on clothing will include those inserted at issue points, and those inserted by the individual, these should be lined out or obliterated. Any marks will be considered obliterated if the process is sufficient to indicate their cancellation.

13. Spots and Stains - Spots and stains easily discernable at a casual glance when the garment is being worn will not be permitted.

14. Hardware - Hardware will not be bent, broken, or missing. Bright and shiny hardware will not disqualify items from a serviceable classification.

SECTION V

MEASURING, RESIZING, AND FOLDING OF CLOTHING

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction the instructor will discuss the procedure for measuring, resizing, marking the new size and folding of clothing; he also will give a demonstration step-by-step of the correct procedures for measuring, resizing, marking the new size and folding of clothing. After the demonstration, the students will perform a practical exercise in these procedures.

B. Objective As a result of this instruction, the student, given various items of laundered clothing, appropriate references, and tape measure, will measure an item of clothing as outlined in appropriate technical bulletin; given appropriate sizing charts, will determine the correct size of each garment measured in accordance with the plus or minus tolerance allowed in pertinent technical bulletins and sizing chart; given marking ink, will mark the determined size in the proper location on the item as outlined in pertinent technical bulletin; given folding guides, will fold each item in preparation for reissue or return to stock. **(AR 32-15)**

II. Presentation

A. History of sizing

1. Ever since primitive man first killed an animal and used its skin as a protective covering, mankind has been concerned with clothing.

2. From this very crude beginning to the development of hand spinning, weaving, and hand construction of clothing, methods were still basically the same.

3. The industrial revolution brought mechanical means to the manufacture of clothing. Invention of the Spinning Jenny, Cotton Gin and the sewing machine completely revolutionized production methods.

4. Clothing, however, was still being manufactured on an individual or tailored basis. Only certain items could be brought ready-made and most clothing worn by the average person was still being made at home.

5. Somewhere along the line, someone realized that most of the people are built alike. A term for that was the Law of Uniformity. These laws simply stated that there was a direct connection or ratio between an individual's height and weight and the rest of his body measurements. Working with that idea in mind people began to be broken down into size groups. Clothing could then be made to fit the general public. This brings us to our topic, The Army System of Sizes or Tariff sizes.

B. Army tariff size system and Measuring, resizing and folding of clothing.

1. The army tariff sizes are broken up into two major groups.

a. Regular tariff sizes are those which most of us will fit into. They are carried at all regional depots, posts, camps, and stations.

b. Supplemental tariff sizes are usually for the outsized individual or one who is extremely difficult to fit. Supply bulletins will list the available supplemental tariff sizes at any particular time. In all cases, however, the only place authorized to carry these stocks are key depots and stations.

c. There are also instances where special measurements have to be taken and garments made to fit a certain individual. We refer to this as Special Measurement Size.

2. In resizing military clothing, there are several points to remember:

a. The garment must be clean and repaired in serviceable condition.

b. Some measurements are taken with the garment buttoned (half breast measurements) and some unbuttoned such as shirt collars and sleeve lengths.

c. Each garment has a specific location for the size marking.

d. Old marks must be marked out before marking new size.

e. Always use marking ink or an indelible pencil.

f. All clothing should be resized according to the sizing tables found in QMTB for each specific garment. **(Refer to Workbook Part III)**

C. Measuring and Resizing Shirts

1. In resizing a shirt, cotton khaki, there are four measurements taken:

a. Collar measurement

b. Half breast measurement

c. Back length measurement

d. Sleeve length measurement

2. Of the four measurements taken, the most important ones are the collar and sleeve measurements.

3. In marking the size in the shirt, the collar and sleeve measure-

ments are written as measured; first the collar measurement, then the sleeve measurement. For example: 17 x 35 inches and marked on the undercollar stand in the center of the collar.

D. Measuring and Resizing Trousers.

1. There are two important measurements to be taken:

   a. Waist measurement

   b. Length measurement

2. In marking the size in a pair of trousers, the waist measurement is first, and the length of the trousers second. For example: 34W 31L or 34 x 31 and marked on the waistband lining directly above the right hip pocket.

E. Measuring and Resizing Coats Wool, AG 44

1. When resizing the Coat Wool AG 44, there are three measurements to be taken:

   a. Half Breast measurements

   b. Sleeve length measurement

   c. Back length measurement

2. In marking the size in a coat, the mark should be about one inch below the collar in the back of the garment.

F. Measuring and Resizing Overcoats

1. When resizing overcoats, there are four measurements to be taken:

   a. Half breast measurements

   b. Length measurement

   c. Sleeve length measurement

d. Belt length measurement

2. In marking the size in an overcoat, the mark is placed one inch below the collar in the back of the overcoat.

G. Measuring and Resizing Coats, Man's cotton (Field Jackets)

1. When resizing field jackets, there are three measurements to be taken:

a. Half Breast measurement

b. Length measurement

c. Sleeve length measurement

2. In marking the size in the field jacket, the mark is placed one inch below the collar in the back of the coats.

H. Folding of Clothing

1. After a garment has been measured and resized it is ready for issue and must be stored. Before we store garments, they must be folded for the following reasons:

a. To enable storing in a minimum of area.

b. To enable simple control for inventory purposes.

2. There are seven steps in folding a shirt; they are as follows:

a. Button all buttons on the shirt.

b. Lay shirt face down.

c. Fold the sides up even and square from center of epaulet down through the center of the pocket.

d. Lay the sleeves on the folded sides and fold the sleeve up about a third of the length.

e. Fold the shirt tail up about 6 or 8 inches.

f. Fold entire shirt in half with the top of fold even with the top of the collar, and the bottom of the fold even with the pocket flaps.

g. Turn shirt over, front up. Square all corners and smooth out all wrinkles.

3. There are five steps in folding a pair of trousers; they are as follows:

a. Button all fly buttons.

b. Lay trousers out flat.

c. Place inseam on outseam on both legs, fly toward folder.

d. Fold trousers in half make sure the bottom of the trousers are even with the top edge of the waistband.

e. Smooth out all wrinkles and make sure front and back creases are straight.

4. There are seven steps in folding a coat; they are as follows:

a. Button all buttons.

b. Lay coat face down.

c. Fold the side over on back of coat, making sure the folds are straight. Using the center of the pocket and the center of the epaulet as a guide.

d. Lay the sleeve flat on the back of the coat.

e. Fold the sleeves up so that the cuffs rest approximately at the elbow.

f. Fold the coat in half; the bottom of the coat should be flush with the top edge of the collar.

g. Turn the coat facing up and square the fold.

HOME STUDY PRACTICAL EXERCISE

1. The sizes that fit the large majority of individuals are called ____________ sizes.

2. When measuring any jacket or coat, the two most important measurements are the ____________ and the ____________.

3. The two most important measurements on a pair of trousers are the ____________ and the ____________ measurements.

4. The two most important measurements on a shirt are the ____________ measurements and the ______ ______ ____________.

NOTES

SECTION VI

INTRODUCTION TO THE FITTING OF CLOTHING

PRECIS

I. Introduction

A. Orientation and Motivation

The next three hours will be devoted to the proper fitting of clothing. The instructor will discuss the proper fitting of all Army issued articles of outer wear.

Q. Why is the knowledge of proper fitting principles important to you as clothing and textile repairmen?

A. (a) Knowledge of proper fitting principles is an absolute necessity in order to perform good alterations.

(b) Properly measured, the individual assigned a correct tariff size, eliminates unnecessary costly alterations.

(c) Proper fitting uniforms are instrumental in keeping morale high.

(d) You must know proper fitting principles to comply with the Army Chief of Staff "Approved Concept of Fit." The approved concept of fit is what has been found to be the correct and proper fit of a garment.

B. Objective

As a result of this instruction, the student, given appropriate references, will define approved concept of fit, subgarments, clothing fitters, and tariff and supplemental sizes, will describe the objectives of fitting a uniform, and explain the importance of proper fit of uniforms as outlined in TM 700-8400-1; given a tape measure and chart on fitting measurements, will physically measure a member of the class; using measurements taken, and given size and model charts, will determine the correct size of garment for the individual; from the garments tried on, assign a size which provides the approved concept of fit with the least alterations; given tailor's chalk, will mark necessary alterations to the garment.

II. Presentation

A. The purpose of learning proper fitting of clothing.

1. Knowledge necessary for proper alterations.
2. Correct fitting eliminates unnecessary alterations.
3. Clothing retains its neat appearance, feels better and lasts longer when properly fitted.
4. Keeps up individuals' morale.
5. Knowledge necessary to comply with concepts set forth in regulations.

B. The subcourse will cover the following on trousers, shirts, jackets, and overcoats.

1. Measuring an individual.
2. Assigning tariff sizes.
3. Appraisal of fit.
4. Marking of alterations.

C. The 12 basic body measurements are:

1. Height
    a. Taken with individual standing in an erect position.
    b. This measurement determines the individual's model.
2. Outside Chest

a. Place tape around shoulders, parallel to the floor.

b. Normally measures 6" more than inside chest.

c. This measurement is necessary to fit the heavy shouldered individual.

3. Inside Chest

a. Tape well under armpits parallel to the floor, and over shoulder blades.

b. Individual standing with back to fitter.

c. Determines the jacket chest size.

4. Waist

a. Measure over shirt; one inch above hip bone.

b. Determines the trouser waist size.

5. Seat

Taken around largest part of the seat.

6. Outseam

a. Measured from lower edge of waistband seam.

b. Along the side seam to one inch above heel.

7. Inseam

a. Measured from normal crotch position.

b. Along inside seam, down to floor and subtract 2½ inches.

c. Determines trouser length.

8. Width of leg

a. Taken around the thigh at crotch level.

b. Not an important measurement.

9. Rise

The difference between the inseam and the outseam.

10. Crotch

Reference point; not an actual measurement.

11. Neck

Measure at collar line; allow for "Adamb Apple."

12. Sleeve

a. From center back to the wrist bone.

b. Determines shirt and jacket sleeve length.

D. Figure groupings, determined by drop.

1. Portly or semi-stout 1" to 4".

2. Full stout or corpulent; 0" to 2" in extreme case, waist is larger than chest.

3. Average drop 4" to 7".

E. Posture Variation

1. Normal or regular

2. Erect; full chested.

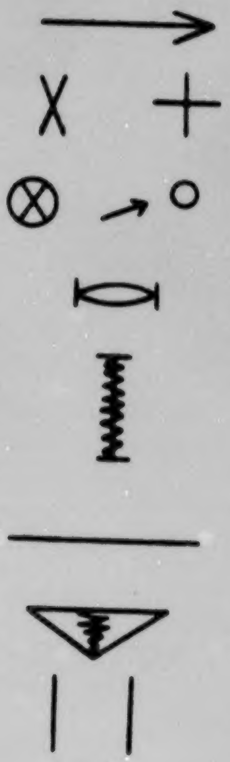
3. Stooping, full back.

F. Shoulder Variation

1. High square shoulder.

2. Regular shoulder.

3. Slope shoulder.



① An arrow will call attention to any general defect *e.g.*, open seams, skipped stitches.

② An X or cross is used to indicate hidden defect which may be inside the garment or under the particular portion being inspected.

③ A circle with a cross is used to indicate a missin button, the cross indicating the exact location o the button. Also, the circle with an arrow pointin to it will indicate a small hole.

④ An oval indicates a missing buttonhole. Its lengt shows the size of the required buttonhole.

⑤ This mark is used to indicate any portion of a garment which is too short; *e.g.* length of trousers o sleeve length. The length of the vertical line show how short a particular part is.

⑥ A line drawn at the edge of any part of a garment indicates that the garment is too long. The distance between the horizontal line and the edge of the garment shows how much too long the particular part is.

⑦ This mark indicates that the seam involved should be let out to that extent.

⑧ Two lines, one on each side of a seam, point out th need to take in the seam the distance between th two lines.

Figure 1 **Defect Marking Symbols**

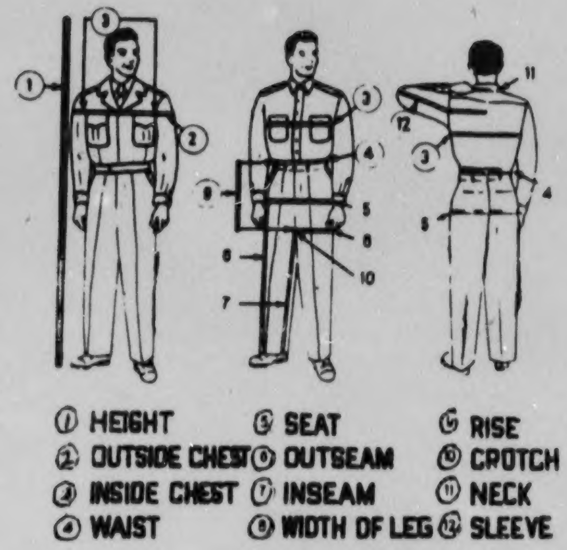
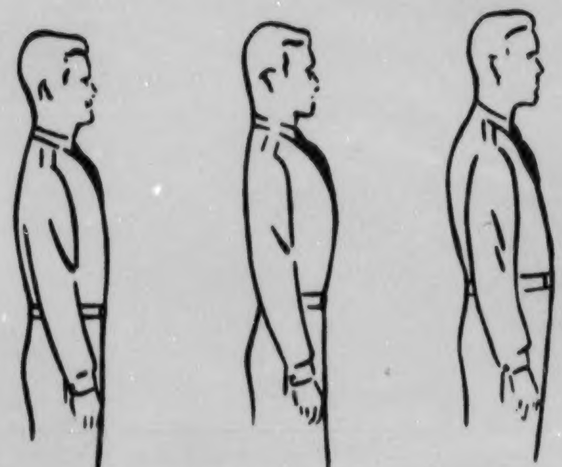

1
2
3
4
5
6
7
8
9
10
11
12
① HEIGHT
② OUTSIDE CHEST
③ INSIDE CHEST
④ WAIST
⑤ SEAT
⑥ OUTSEAM
⑦ INSEAM
⑧ WIDTH OF LEG
⑨ RISE
⑩ CROTCH
⑪ NECK
⑫ SLEEVE

Figure 2 Basic Body Measurements



Normal, Regular Back and Chest

Erect, Full Chest, Flat Back

Stooping, Full Back, Flat Chest, Flat Seat

Figure 3 Types of Posture Variation

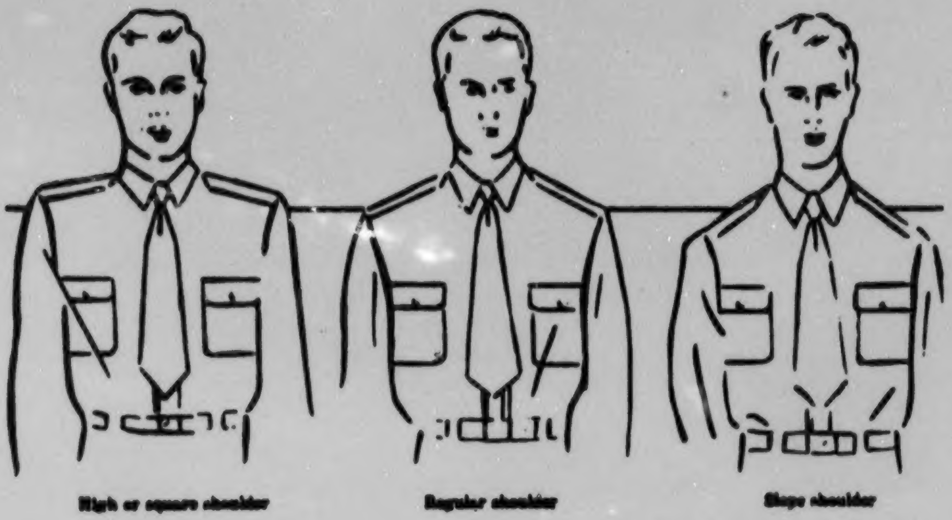

High or square shoulder
Regular shoulder
Slope shoulder

Figure 4 Types of Shoulder Variation

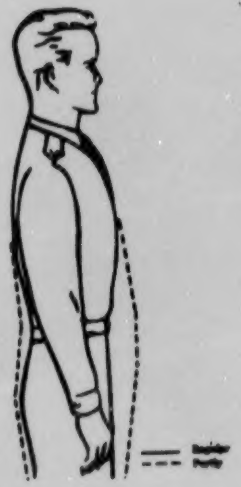


Figure 5 Drop Variation

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INTRODUCTION TO FITTING OF CLOTHING

Home Study Practical Exercise

I. Study assignment. See appendix I.

II. Complete the following statements by filling in the bland spaces with the correct information.

1. There are ____________ basic body measurements.

2. A regular model should be given to an individual measuring in height from ______________ to __________________.

3. A short model should be given to an individual measuring in height from __________________ to _________________.

4. Normally, the outside chest will be approximately _________________ inches larger than the inside chest.

5. Measure waistline one inch above the ________________ bones.

6. The rise, is the difference in inches between the _________________ seam and the ___________________ seam.

7. A portly or semi-stout man will have a drop of between _____________ to _______________ inches.

8. There are three groupings for shoulder variations.

    a. High or square shoulders.

    b. Regular shoulders.

    c. ________________________.

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FITTING OF TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

During this hour the student will center his attention on the lower part of the body. The instructor will go into the details, and measurements that effect the fit of trousers. Proper fitting of trousers are important because it effects the appearance and comfort of the individual and also the wear of the garment.

B. Objectives

1. Upon the completion of this period of instruction, the student should have a thorough grounding of the methods used in measuring an individual and assigning correctly fitted trousers.

2. A working knowledge of the correct procedures and principles in appraising the fit of regular tariff size trousers.

3. A working knowledge of the authorized alterations in fitting regular size trousers.

II. Presentation

A. Three important reasons for proper fit of trousers are:

1. Appearance
2. Comfort
3. Wear

B. Measurements necessary

1. Waist
2. Inseam
3. Outseam

4. Rise

5. Seat

6. Width of leg

C. Assign tariff sizes (availability)

1. Check first for best combination waist and length.

2. Check for best length and later waist.

3. Check for best waist and alter length.

D. Check points in concept of fit. Appraise the fit on the basis of:

1. Rise

a. Should fit without looseness or constriction.

b. Should have slight ease at crotch.

2. Seat

a. Should have ease across seat, but no wrinkles from seat to waist.

b. There should be no wrinkles at all above hip at back of waist.

3. Waist

a. Should have about ½" ease.

b. The bottom of the waistband should rest on the top of the hipbones.

4. Length

a. Hang straight, without a break, touching top of shoes in front.

b. Back comes to one inch above top of heel.

5. Authorized Alterations

a. Take in the waistline.

b. Shorten or lengthen the bottom.

c. Alter the crotch.

6. You will not alter:

   a. If cost of alteration is over 25% of original cost.

   b. If alteration will change garment from "Approved Concept of Fit".

   c. If individual can be fitted in another tariff size.

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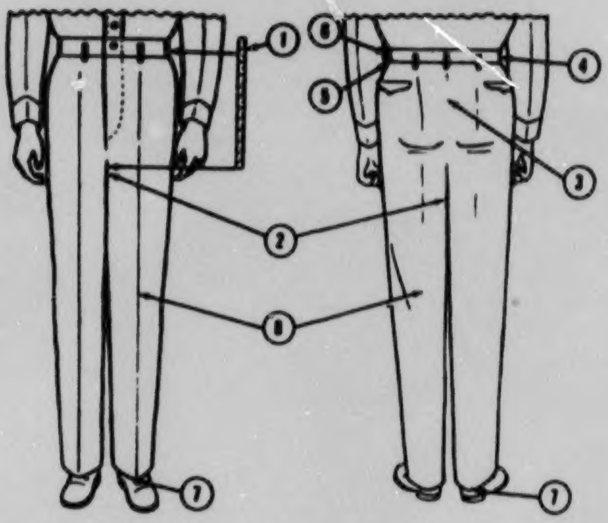

(1) Rise should fit without looseness or constriction

(2) Crotch must have a slight ease

(3) Seat should be an easy fit; no wrinkles below back waist

(4) Waist must have about ½" of ease

(5) Waistband bottom is at top of hipbone

(6) Waist measure will be taken over shirt; snug, not tight

(7) Bottom of the trousers must rest on top of the shoes without a break in the front and 1" above the top of the heel in the back. Both measurements are to be taken when wearing low quarter shoes.

(8) Trouser crease must hang straight; not twisted

Figure 6 · Appraisal of the Fit of the Trousers

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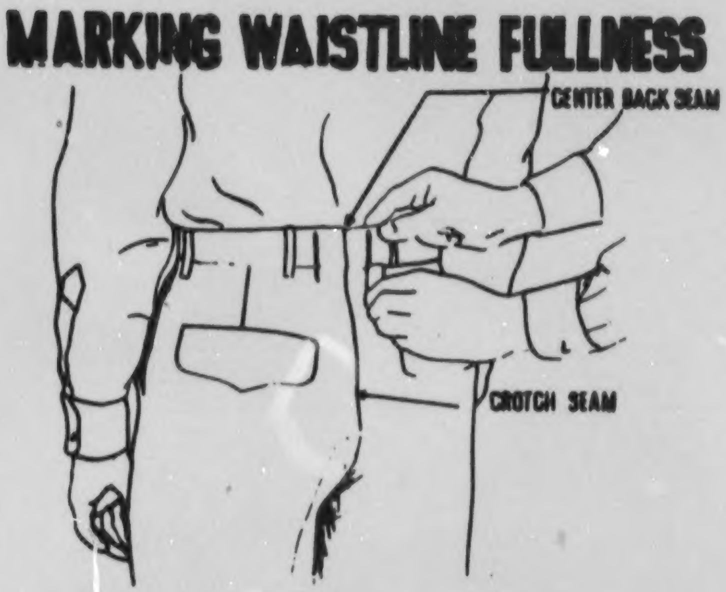
MARKING WAISTLINE FULLNESS
CENTER BACK SEAM
CROTCH SEAM

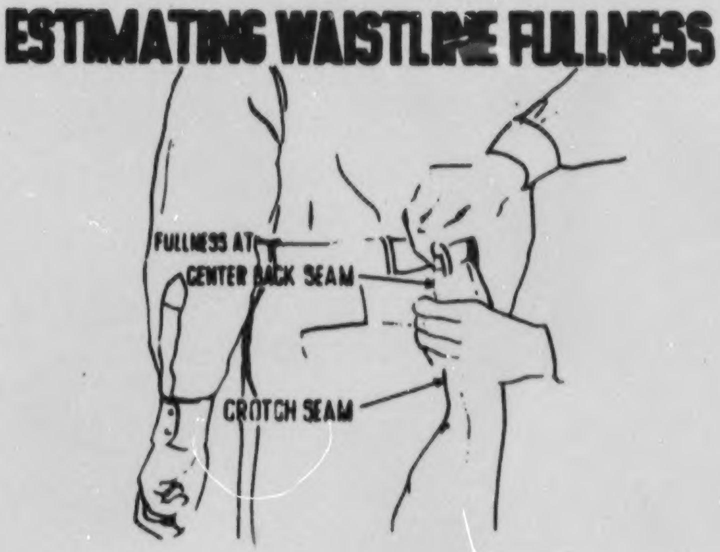
ESTIMATING WAISTLINE FULLNESS
FULLNESS AT
CENTER BACK SEAM
CROTCH SEAM

Figure 7 **Marking Waistline Fullness**

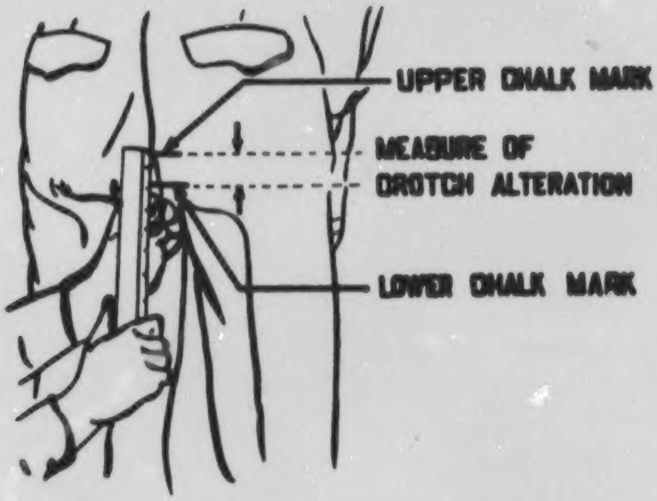
UPPER CHALK MARK
MEASURE OF CROTCH ALTERATION
LOWER CHALK MARK

Figure 8 Measuring Crotch Alteration

ESTIMATING TROUSER LENGTH

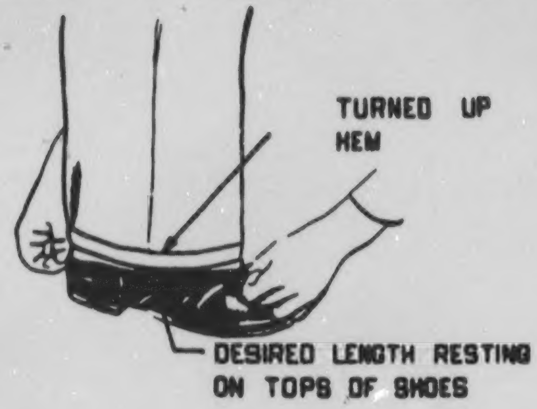
TURNED UP HEM
DESIRED LENGTH RESTING ON TOPS OF SHOES

Figure 9

FITTING OF TROUSERS

PRACTICAL EXERCISE

I. Introduction

This practical exercise is to enable the student to apply what he has learned thus far in fitting. The students will be working with live models, (their buddies) in measuring and assigning regular tariff size trousers. At the end of this period, the student should know exactly the size trousers they wear. Also they will know what to check for appraising the fit of trousers.

II. Study Reference - **TM 700-8400-1, page 10, par 9.**

III. Supplies and tools, Required

Tape measure (one per student)

Trousers (one per student)

Class "A" uniform trousers, (one per student; unbloused)

IV. Direction to students

Perform this practical exercise as directed by the instructor following the job breakdown (B VI) as closely as possible. If there are any difficulties, do not hesitate to call on the instructor for assistance. Record all six measurements.

V. Performance Standards

The performance standards (A par VI) are set up to be used in checking the work of the student, following the job breakdown so that the important skills to be learned during this assignment can be determined. The instructor will check the work by these standards through observation of performance and through inspection of final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the students are as follow:

1. Have all proper measurements been taken and listed?
2. Has the best size selection been made for the individual?
3. Have all the points set up in steps 9, 10, 11, and 12 been covered in keeping with "approved concept of fit?"
4. Have you listed all possible improvements that could help the individual fit?

B. The procedures listed to the left of the page in the breakdown below will be followed in the order given. The key points, which correspond in number to the procedure for each breakdown, are listed to the right of the page.

1. Take waist measurement.	1. a. The measurement must be taken over the shirt.
	b. The measurement must be taken over the hipbone.
	c. The tape measure must be snug but not tight.
2. Inseam measurement.	2. a. The subject being measured stands with back to fitter.
	b. The tape must be well against the crotch seam.
	c. Measure down to the previously stated length.
3. Outseam measurement.	3. a. Tape must be at lower edge of waistband (or on top of the hipbone).
	b. Tape is run to the bottom of the desired length at the outside seam.

4. Rise Measurement.	4. Subtract the difference between the outseam and the inseam.
5. Seat Measurement.	5. Measure around the largest part of the hips or seat.
6. Width of leg measurement.	6. Measure around the thigh at the crotch level.
7. Assign tariff sizes.	7. According to the available tariff sizes, find the best possible fit.
8. Check size issued.	8. The size issued and individual can be checked by following the steps covered in measuring and resizing.
9. Check rise.	9. a. The rise should fit without looseness or constriction. b. The hand may be placed under the crotch to make certain that the trousers are well up into the crotch.
10. Check seat.	10. a. There must be an easy fit at the seat. b. There must be no wrinkles above hips.
11. Check waist.	11. The waist must fit snugly above the hipbones, but with at least ½" looseness.
12. Trouser length.	12. a. The front crease must touch the top of the shoes without a break. b. The bottom of the back crease must be 1" above the top of the heel.

STUDY QUESTIONS

1. What are the authorized alterations on trousers?

   a.

   b.

   c.

2. What are three situations where you will not under any circumstances alter any pair of trousers?

   a.

   b.

   c.

3. What are the five steps in fitting a man?

   a.

   b.

   c.

   d.

   e.

4. What are the two most important measurements?

   a.

   b.

FITTING OF TROUSERS

Home Study Practical Exercise

I. Study Assignment See Appendix I

II. Complete the following statements by filling in the blank space with the correct information.

1. Trousers not having the proper fit will________ out quicker.

2. The two most important measurements in fitting a pair of trousers are the ____________ and ______________.

3. Trousers are available in waistlines from _____ to ______ inches.

4. Lengths vary from __________ to __________ inches.

5. The first two steps in fitting trousers are ______________ and ______________ ______________ ______________.

6. The last three steps are ______________ ___________, then ______________ ______________, and ______________________________.

7. A trouser with a 33 inch inseam will be considered a _________ rise trouser.

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FITTING OF SHIRTS

PRECIS

I. Introduction

A. Orientation and Motivation

During this period, the students are going to go through a similar procedure as they did during the past period. However, this period will be devoted to shirts instead of trousers. They should already be familiar with the basic body measurements that apply to the shirt. They were shown, and each measurement was discussed fully during that period of instructions given on fitting of clothing. Proper fitting of shirts are important, because it affects the appearance and comfort of the individual and the wear of the garment.

B. Objectives

1. Upon completion of the subcourse, the student will have a thorough grounding of the methods used in measuring an individual and assigning correctly fitted shirts, cotton and poplin.

2. A working knowledge of the correct procedures and principles in appraising the fit of regular tariff size shirts.

II. Presentation

A. Three important reasons for proper fit of shirts are:

1. Appearance
2. Comfort
3. Wear

B. There are five steps in fitting a shirt.

1. Take necessary measurements.

2. Assign tariff size.

3. Try on selected size.

4. Try on other sizes and pick the best one.

5. Mark for alterations.

III. Measurements

A. Neck

1. Make sure tape is snug, level and not twisted.

2. All shirts are provided with slight overages (3/8 inch in collar for shrinkage.)

B. Sleeves

1. Bend elbow in front of individual level to floor. Measure from center to back to wristbone.

2. The length of sleeves should fall to the bottom of wristbone for poplin shirts.

3. The length of sleeves should fall 1 inch below the center of the wristbone for khaki shirts.

4. All shirts are provided with a slight overage (one half inch to one inch in sleeve measurement).

IV. Assigning tariff sizes

A. Neck

1. Neck sizes range from 13 to 17½ inch.

2. Sleeves may be shortened in some cases.

B. Trying on of shirts.

1. Collar should fit snug but loose enough for comfort.

2. The shirt should be fully buttoned, including the sleeve, before fit is appraised.

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3. The chest and shoulders fit with ample room for free use of arms.

4. Individual should be advised of overages in neck and sleeves for shrinkage.

FITTING OF SHIRTS

PRACTICAL EXERCISE

I. Introduction

This practical exercise is to enable the student to apply himself to actual situations in the principles of fitting shirts. He will be able to take the fitting measurements of his buddies and for many of them this will be the first time they will know their correct measurements. They will also be able to appraise each other's fit.

II. Study reference - **TM 700-8400-1, page 12, par 10.**

III. Supplies and tools required

Tape measure (one per student)

Shirts (one per student)

IV. Direction to students

Perform this practical exercise as directed by the instructor following the job breakdown (B VI) as closely as possible. If there are any difficulties, do not hesitate to call on the instructor for assistance.

V. Performance standards

(A par VI) are set up to be used in checking the work of the student, following the job breakdown so that the important skills to be learned during this assignment can be determined. The instructor will check the work by these standards through observation of performance and through inspection of final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the student are as follows:

1. Have all proper measurements been taken and listed?

2. Has the best size selection been made for individual?

3. The final fit should be appraised according to approved concept of fit.

4. All possible improvements should be noted, when possible, in the form of recommendations.

B. The procedure listed to the left of the page in the breakdown below will be followed in the order given. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page.

1. Measure the neck.	1. a. Make sure tape is not twisted. b. Make sure tape is placed around middle of neck.
2. Measure sleeve length.	2. Arm is to be measured from the center of the back of the neck, (top of spinal column) to the wristbone, with the elbow bent in front, level with the floor.
3. Measure Chest.	3. This is an added precaution to fit the unusual sized individual.
4. Assign Tariff sizes.	4. Tariff sizes are assigned according to neck and sleeve length measurements.
5. Check size originally issued your partner.	5. a. Record this size. b. Record the size you have determined.
6. Appraise the fit of your partner's shirt.	6. a. Check collar to determine whether it fits snug for neat appearance. b. Check to see if sleeves are at proper length listed in key points under step. c. Check fit at chest, shoulders and waist. There should be ample room to allow for freedom of movement.

7. Record faults found.	7. Check off the above three points.

STUDY QUESTIONS

1. What are the five steps in fitting a shirt?

    a.

    b.

    c.

    d.

    e.

2. What are the two measurements in fitting a shirt?

    a.

    b.

NOTE: PAGE 6.27 HAS BEEN OMITTED, HOWEVER ALL MATERIAL IS INCLUDED.

FITTING OF COATS WOOL, SHADE AG 44 AND AG 344 AND OVERCOATS

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, the instructor will discuss the proper procedures in measuring, assignment of sizes and appraisal of the fit of wool coats shade AG 44, and coats field with liner; he will also give a demonstration step-by-step, of the correct procedures used in measuring an individual for the proper fit of the wool coat AG 44 and coat field with liner. After the demonstration, the students will perform a practical exercise in measurement procedures, and assignment of sizes and appraisal of the fit of coats AG 44 and coats field with liner.

B. Objectives

The objectives in this period of instruction is to have the student attain a thorough grounding of the methods used in measuring an individual and assigning correctly fitted coats AG 44 and coats field with liner; also a working knowledge of correct procedures and principles in appraising the fit of regular tariff size coat AG 44 and coats field with liner.

II. Presentation

A.

1. The importance of correct fit cannot be over-emphasized. Proper fit is the primary factor necessary to establish a smart military appearance, and to insure wearing comfort. High morale and pride in the uniform are created when the wearer is assured of being well dressed and at ease in the uniform.

2. Anyone with proper direction can learn how to fit trousers and shirts, but when it comes to coats, it becomes a different story; for now we are dealing with tailored garments.

3. Remember we are still concerned with the three watchwords of proper fitting.

   a. Comfort

   b. Appearance

   c. Wear

B. Fitting of Coats AG 44

1. The coat, wool Army Green is sized numerically in one inch chest sizes, and are made in five models according to height measurements.

   a. extra short

   b. short

   c. regular

   d. long

   e. extra long

2. The coat, wool AG 44 is single breasted with four buttons, and it extends below the crotch to a point approximately 4 inches from top of finger with arms hanging straight at the sides.

3. Sleeve lengths should fall to a point approximately one inch past the bottom of the wristbone. When properly fitted, the coat sleeve covers the shirt sleeve.

4. The coat should fit easily over the chest and shoulder with enough freedom across the chest to permit a slight drape effect. The shirt collar should show approximately one fourth of an inch above the coat collar.

5. The fit at the waist of the coat is more pronounced. The Army Green coat is designed for wear without a belt. However, it is designed to be somewhat form-fitting around the waist without snugness and with some fullness and drape effect.

6. To determine the first try-on coat, the numerical size of the coat is obtained from the chest measurements of the individual in inches. The length (model) is obtained from the height measurements of the individual (such as short, regular, or long). Selecting the right model is important if the proper concept of fit is to be achieved.

C. Fitting of Coat Field w/liner OG 107

1. The coat field with liner or overcoat, as it is commonly referred to, is a full length double-breasted coat with a removable button-in wool liner, a tongueless bar-buckel belt, two side slash pockets, shoulder loops and one-buttonhole adjustable tab on each sleeve.

2. The coat is made in three models; they are:

   a. short
   b. regular
   c. long

3. The chest sizes are:

   a. small
   b. medium
   c. large
   d. extra large

4. The overcoat when worn with liner is designed to fit snugly around the collar and smoothly over the shoulders and chest. A degree of fullness in the waist is taken up by the belt.

5. The approved length of the coat should be such that the hemline is midway between the bottom of the kneecap and upper calf of the leg; 14 to 16 inches from the ground.

6. The sleeve should cover the sleeves of the sub-garments by being approximately three-quarters inch longer than the sleeve of the sub-garment.

7. Normally the only alteration required on the overcoat is to shorten or lengthen sleeves and to shorten the hemline.

FITTING OF COATS WOOL, SHADE AG 44
AND AG 344 AND OVERCOATS
PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the student will receive a thorough grounding of methods used in measuring an individual and assigning correctly fitted wool coats; Army Green and overcoats also a working knowledge of the correct procedures and principles in appraising the fit of regular tariff sizes of wool coats Army Green and overcoats.

II. Study Reference: **TM 700-8400-1, Page 3, par 7.**

III. Supplies, Tools, and Equipment Required

Army Green Coat (ample supply)
Overcoat w/liner (ample supply)
Tape measure (one per student)

IV. Directions to the student

Follow the step-by-step procedures outlined in paragraph VI B. If you have any questions regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A Par VI) are set up to be used during the job breakdown is to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in the work of the student during and upon completion of the breakdown "B" below are as follows:

1. Have all the necessary measurements been taken and recorded?

2. Has the best size selection been made for the individual according to the listed chart?

3. Have all the points in the correct concept of fit been checked?

4. Have all possible improvements through alterations been indicated by the correct symbols?

B. The procedures for fitting the Army Green Coat, wool and overcoat are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

C. Taking the measurements for the Army Green Coat.

1. Measure inside chest.	1. a. Take measurement over a shirt.
	b. Place tape well up under the arms and over the shoulder blade on a horizontal line taking the floor as a level. This measurement is taken snug.
	c. Take measurement from center of the back instead of the front with the subject standing in a natural position and not with the chest fully expanded.
2. Measure height.	2. a. Take measurement with shoes, (low quarters), on.
	b. From floor to natural height with subject standing in an erect manner.
	c. This measurement must be exact; as it regulates the length of the coat and depth of the waist.

D. Assign Tariff Size.

1. Select best combination	1. a. Select best chest size (actual

of measurements.	chest measurements). b. Select a proper model. MODEL. Extra short 5' to 5'5" MODEL. Short 5'5" to 5'8" regular 5'8" to 5'11" long 5'11" to 6'2" extra long 6'2" & up c. Check for unusual weight distribution.
2. Try on garment and appraise fit of coat.	2. a. Check sleeve length (should fall 1 inch past the bottom of the wristbone). b. Coat should fit easily over the chest and shoulders with enough freedom across the chest to permit a slight drape effect rather than a snug fit and provide ease under the arms.
3. Record alteration and necessary symbols.	3. Be certain that alterations are necessary, and alterations authorized.

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FITTING OF COATS WOOL SHADE AG 44 AND OVERCOATS

Home Study Practical Exercise

I. Study assignment - **TM 700-8400-1, page 3-6, par 15-18.**

II. Home Study Practical Exercise

1. The four groupings in overcoat chest sizes are ___________, _______ and ____________.

2. The three length groupings or models available in the overcoat are ___________, ___________, and ___________.

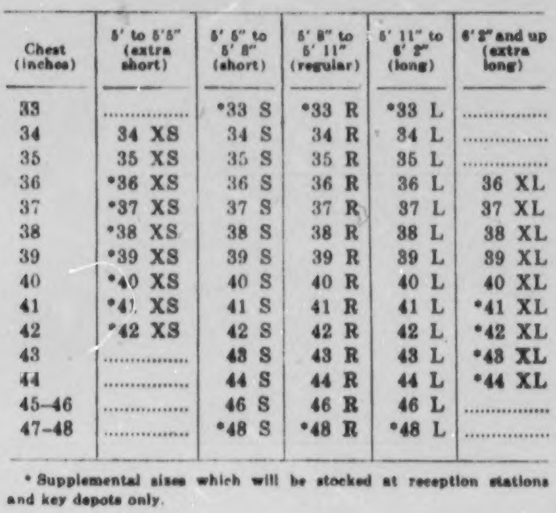
3. The authorized alterations on overcoats are ___________ and ___________.

4. What are the four authorized alterations on an Army Green coat?

   1. ____________________
   2. ____________________
   3. ____________________
   4. ____________________

5. The sleeve lengths on an Army Green coat should fall to a point approximately __________ past the bottom of the wristbone when properly fitted.

SIZES AND MODELS OF ARMY GREEN COAT



Chest (inches)	5' to 5'5" (extra short)	5' 5" to 5' 8" (short)	5' 8" to 5' 11" (regular)	5' 11" to 6' 2" (long)	6' 2" and up (extra long)
33	....	*33 S	*33 R	*33 L	....
34	34 XS	34 S	34 R	34 L	....
35	35 XS	35 S	35 R	35 L	....
36	*36 XS	36 S	36 R	36 L	36 XL
37	*37 XS	37 S	37 R	37 L	37 XL
38	*38 XS	38 S	38 R	38 L	38 XL
39	*39 XS	39 S	39 R	39 L	39 XL
40	*40 XS	40 S	40 R	40 L	40 XL
41	*41 XS	41 S	41 R	41 L	*41 XL
42	*42 XS	42 S	42 R	42 L	*42 XL
43	....	43 S	43 R	43 L	*43 XL
44	....	44 S	44 R	44 L	*44 XL
45–46	....	46 S	46 R	46 L	....
47–48	....	*48 S	*48 R	*48 L	....

* Supplemental sizes which will be stocked at reception stations and key depots only.

Figure 10

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SIZES AND MODELS OF THE OVERCOAT COTTON OG 107

Chest (inches)	Height		
	5'3" to 5'7"	5'7" to 5'11"	5'11" and up
33 to 37	Small short	Small regular	Small long
37 to 41	Medium short	Medium regular	Medium long
41 to 45	Large short	Large regular	Large long
45 and up	....	Extra-large regular	Extra-large long

Figure 11

SECTION VII

HAND SEWING

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period of instruction, the instructor will discuss Hand Sewing; to include implements used in hand sewing, various types of stitches used, technique of manipulating the needle and thimble.

2. When man first found a need for protection from the elements, he draped an animal skin around his body. He further advanced his knowledge by learning to take vines and tie smaller skins together. This was the beginning of hand sewing. With a hooked bone he learned that he could get the vines to pass through the skins easier. Later on he learned that a small hole in the bone was even better than the hook. From this developed one present day needle. Hand sewing is an art that has developed through the years to what we know it to be today.

3. Even with the vast improvements in the manufacturing and repairing of clothing with the use of sewing machines, the art of hand sewing still plays a big part in this field.

4. In certain instances, hand sewing is superior to machine sewing; for example: Some finished seams, such as the armhole lining seam on the Army Green Coat also the crotch seam at the fly on Army Green trousers. At these points, it is mandatory to have a hand stitch for a neat military appearance.

B. Objective - The objectives in this period of study is to give the students a general knowledge of the importance of hand sewing and a working

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knowledge of the implements used in hand sewing.

II. Presentation

A. The purpose of learning hand sewing.

1. Almost anyone can thread a needle and sew; but the mark of a good repairman is the ability to sew well by hand. It is important for you as a clothing and textile repairman to learn to sew by hand; to eliminate any unnecessary backlog of work in the field if a machine breaks down or the power failed. Your ability to sew by hand would be put to good use.

2. Your ability to sew by hand will definitely aid you when sewing by machine. By applying the basting stitch, you will have both hands free to guide the material under the presserfoot thereby, enabling you to sew a neater seam.

B. Implements used in hand sewing

Needles come in three sizes:

1. Sharps, which are the longest
2. Ground-down, the medium size
3. Betweens, which are the shortest
4. The purpose of the needle is to carry the thread through the material.

C. Thread

1. The purpose of thread is to hold material together or in place.
2. The size of thread commonly found in the Army is 40-3 cord left twist thread.

D. Thimble

1. The thimble is used to protect and aid the finger in pushing

the needle through the material.

2. The size of the thimble is determined by the individual's finger.

E. Beeswax

1. Beeswax is used to prevent the thread from knotting while sewing.
2. It is applied by running the thread over the wax.

F. Button-Hole Cutter

1. It is used to cut button-holes in material.
2. It will cut button-holes in sizes from ½" to 1½" long.

INTRODUCTION TO HAND SEWING

HOME STUDY PRACTICAL EXERCISE

I. **Study Assignment: TM 10-267, page 4, Section II.**

II.

1. When is hand sewing used in place of machine sewing?

   Ans.

2. List two important points to remember when hand sewing?

   a.

   b.

3. What is a basting stitch?

   Ans.

4. The basting stitch is used for what purpose?

   Ans.

5. The felling stitch is used for what purpose?

6. What are the three characteristics of a good weaving stitch?

   a.

   b.

   c.

7. The cross stitch is used for what purpose?

   Ans.

8. What are the two types of stitches used in hand sewing a buttonhole?

   a.

   b.

9. How close should the thread of each buttonhole stitch be to the preceding stitch?

Ans.

10. How many stitches are required to tack a buttonhole?

Ans.

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Figure 12 -- Hand-Sewing Needle

Figure 13 -- Cone of Thread

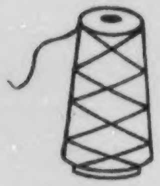


Figure 14 -- Thimble

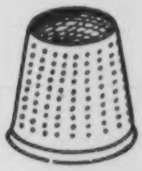


Figure 15 -- Beeswax

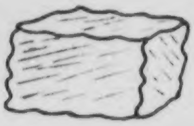
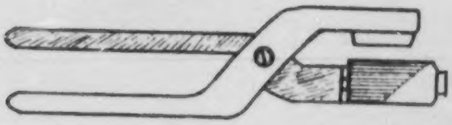


Figure 16 -- Button-hole Cutter



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HAND SEWING A BUTTON ON A GARMENT

PRECIS

I. Introduction

A. Orientation and Motivation

During the next period of instruction the instructor will discuss hand sewing a button on a garment to include setting the button and making the neck. He also will give a demonstration, step-by-step, of the procedures used in hand sewing a button on a garment. After the demonstration, the students will perform a practical exercise practicing how to make this type of repair.

B. Objective - The objectives in this hour of study are to give the students a working knowledge of the importance of learning to sew a button on by hand also a thorough grounding of the method used in hand sewing a button.

II. Presentation

Many of you while preparing your clothes for inspection have found buttons missing and would have to sew them on in order to pass the inspection. Frequently, you have found that the buttons that you sewed on would come off easily and you would have to renew them.

A. Usually buttons come off due to:

1. Improper thread: for instance, thread too light in weight or too weak to stand up under the strain that is usually expected of a button.

2. Improper stitching: such as, not tying a knot in the end of the thread or not tying it off when you have completed your stitching.

3. You also see buttons that come loose due to not placing

enough stitches to hold the button on the garment.

B. True, the Army has button machines to use in repairing of garments, but many times these machines are not available and it will be necessary for you to have the knowledge and skill to sew a button by hand.

C. There are three types of buttons used on military clothing.

1. Flat buttons; these buttons are used on khaki trousers and shirts, also on overcoats.

2. Shank buttons; these types of buttons were used on the old style overcoat and Army blouse; however, it is still used on officer blouses and you may come in contact with this type of button as a clothing repairman.

3. Tack buttons, these types of buttons were used on the old style fatigue clothing but at present it is almost obsolete. This button is not sewn on by hand or machine but is applied by a special purpose machine or die set.

D. The size of a button is in terms of lignes. There are forty lignes to an inch. The diameter of a button determines the size and lignes designation.

E. Replace all broken, missing and damaged buttons with the correct size, shape, and composition as those originally affixed to the garment also using the proper size thread for the size button being sewn on.

HAND SEWING A BUTTON ON A GARMENT

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the student will receive a thorough grounding of sewing a button on a garment. It is imperative that the student be aware of the importance of the correct procedures for sewing a button on a garment.

II. Study Reference - **Par VI, B, student workbook.**

III. Supplies and Tools Required

Buttons (ample supply)
Needles (ample supply)
Thread (ample supply)
Thimble (one per student)
Beeswax (ample supply)
Salvage material (ample supply)
Shears (one per student)

IV. Direction to students

This practical exercise will be performed by you as set forth (By par VI) in the step-by-step procedure. If you are in doubt at anytime or have any questions, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A Par VI) are set up to be used in checking the work of the student, following each job breakdown so that the important skills to be learned during this assignment can be determined. The instructor will check the work by these standards through observation of performance and through inspection of the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the students are as follows:

1. Does the thread match the color of the button and the color of the garment?
2. Is the button stitch smooth, even, and tight?
3. Proper size button.
4. Neatness of completed work.
5. Proper color of button.

B. The step-by-step procedures listed to the left of the page in the breakdown will be followed in the order given. The key points, which correspond in number to the procedure for each breakdown, are listed to the right of the page.

1. Put the needle through the garment.	1. a. Put the needle through from the inside of the garment. b. Take a few stitches in order to anchor the thread in the body of the garment.
2. Place the button on the needle.	2. a. Put the needle through one of the holes in the button. b. Let the button slide down the thread to the correct position for the final tie.
3. Stitch the button to the shirt.	3. Stitch in and out of the hole of the button, first through one pair of the holes and then through the other pair.
4. Wrap the thread.	4. a. When the sewing is complete, wrap the thread around the stitches (between the button and the cloth) about six times. b. Take a few stitches through the wrapped thread.
5. Lock the stitch.	5. Lock the stitch by knotting the thread on the inside of the cloth.

SECTION VIII

BASTING STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, the instructor will discuss the uses and the construction of the basting stitch to include stitch length and intervals and their purposes. He also will give a demonstration step-by-step in the construction of the basting stitch. After the demonstration, the students will perform a practical exercise practicing how to construct the basting stitch.

B. Objective - The objectives in this period of study is to give the students a working knowledge of the uses and construction of the basting stitch. Also a thorough grounding of the use and construction of the basting stitch.

II. Presentation

A. Uses of the basting stitch

1. Basting is very common in tailoring and before any permanent stitches are put into a garment, a temporary stitch is put in to hold the material in position or to see if the garments will fit the individual properly. This stitch is the basting stitch.

2. As stated previously, the basting stitch is used to hold material together while being sewed by hand or machine. After the permanent stitch has been placed into the material the basting stitch is then removed.

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B. The length of the basting stitch depends on the work that has to be performed. If the stitch is placed on the collar of a jacket, many stitches are needed to hold the material in place, but on the legs, of trousers when they are being hemmed only a few are needed and they can be placed a reasonable distance apart.

BASTING STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the students will receive a thorough grounding of the procedures used in the construction of the basting stitch. It is imperative that the students be aware of the importance of knowing the correct procedures used in constructing the basting stitch.

II. **Study Reference: TM 10-267, page 4, par 7b, figure 4.**

III. Supplies, tools and equipment required.

Hand Needles (ample supply)
Thread (ample supply)
Beeswax (ample supply)
Salvage material (ample supply)
Thimbles (one per student)
Shears (one pair per student)

IV. Direction to the Students

Follow the steps by step procedures outlined in paragraph VI.B. If you have any question regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A Par VI) are set up to be used following job breakdown is to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the students upon completion of the breakdown "B" below are as follows:

1. Check the length of the stitch.
2. Be sure that each stitch is lined up with the other students.
3. Check for proper tack at end of basting stitch.

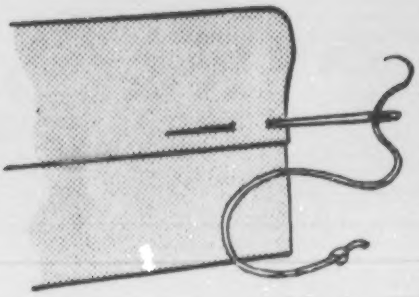
B. The procedures for constructing the basting stitch are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

PRODUCTION STEPS	KEY POINTS
A. Construction of the Basting Stitch.	
1. Prepare Material.	1. a. Select a piece of material 8x8 inches square.
	b. Place material on table face side up, and mark down from top of material 2 inches.
	c. At the 2 inch mark draw a straight line across the length of material.
	d. Draw a second line across the length of material $1\frac{1}{2}$ inches from the top of material.
	e. Draw a third line across the length of material $\frac{1}{2}$ inch from the top of material.
	f. At this time you should have three marked lines across the top of material at the following measurements: 2", $1\frac{1}{2}$", and $\frac{1}{2}$" from edge of material.
	g. Starting at the right edge of material, measure and mark in $\frac{1}{4}$ inch, and $\frac{1}{2}$ inch from the edge.
	h. From $\frac{1}{2}$ inch mark, measure and mark 1 inch. Continue the markings across the length of the material in the same manner. When

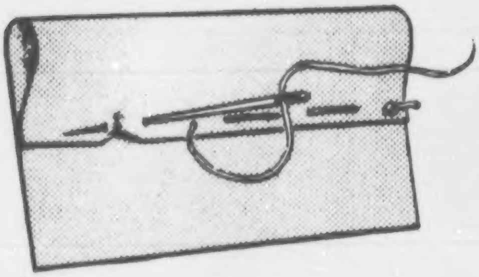
completed you should have six squares on the material (1 inch squares and ¼ inch space between squares.)

2. Sewing of Basting Stitch.

2.
- a. Thread needle and prepare thread by waxing and knotting.
- b. Fold the material on the 2" mark forming a hem.
- c. Starting at the right edge of material on the 1½ inch marked line, insert needle in the ¼" mark, and bring out point of needle on the 1½" mark.
- d. Pull needle and thread through the material (at this point the knot of the thread should be resting on the ¼" mark).
- e. Insert the needle at the left edge of the 1" mark, and bring up the point to the right edge of the next 1" mark.
- f. Pull needle and thread through the material (at this time the first basting stitch should be formed 1" length).
- g. Continue procedures c thru f across length of material.
- h. Apply the basting stitch on the ½" line of the hem. Starting from the right edge sew across the length of material following procedures in par c thru g above.



Step 1



Step 2

Figure 17 - Construction of the Basting Stitch

CROSS STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, the instructor will discuss the purpose, use and construction of the cross stitch; to include depth, widths and intervals. He also will give a demonstration step-by-step in the construction of the cross stitch. After the demonstration, the students will perform a practical exercise practicing how to make the cross stitch.

B. Objective - The objectives in these hours of study is to give the students a working knowledge of the use and construction of the cross stitch and also a thorough grounding of the construction of the cross stitch.

II. Presentation

A. The cross stitch is used to sew raw edges of material to keep it from raveling, as in hems.

B. The cross stitch is a blind stitch used in most instances to hem trouser legs and places where a blind stitch is necessary and a machine cannot satisfactorily operate.

C. The cross stitch should be smooth, even and completely hidden on the right side of the material.

CROSS STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the students will receive a thorough grounding of the procedures used in the construction of the cross stitch. It is imperative that the students be aware of the importance of knowing the correct procedures used in the constructing the cross stitch.

II. **Study Reference: TM 10-267, page 8,9, figure 7.**

III. Supplies, Tools and Equipment Require

A. Hand Needles (ample supply)

B. Matching Thread (ample supply)

C. Beeswax (ample supply)

D. Salvage Material (ample supply)

E. Thimbles (one per student)

F. Shears (one per student)

IV. Direction to the Students

Follow the step-by-step procedures outlined in paragraph VI B. If you have any questions regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A Par VI) are set up to be used following the job breakdown is to enable the instructor in checking the students' performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the student upon completion of the breakdown below are as follows:

1. Check the correct length of the stitch.
2. The cross stitch must be smooth, even and completely hidden on the right side of the material.

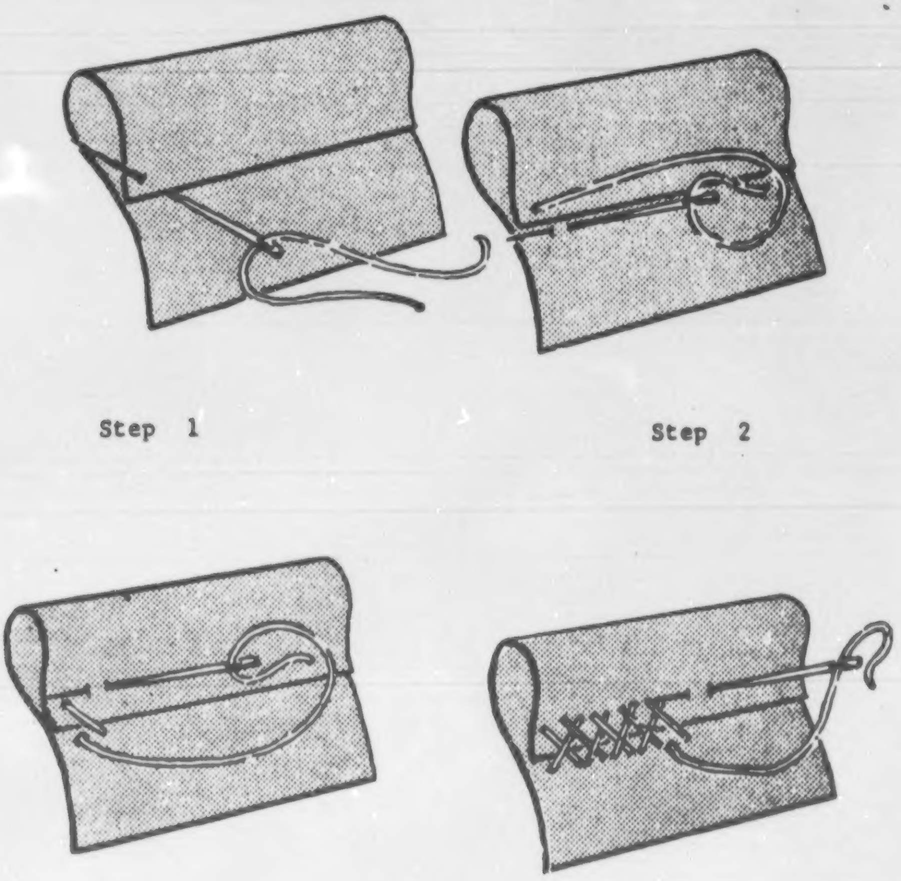
B. The procedures for constructing the cross stitch are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

Construction of Cross Stitch

1. Prepare material.	1.	a. Select a piece of material 8x8 inches square.
		b. Prepare a hem with the same procedures listed in par A (Construction of Basting Stitch) in Performance Lesson Plan.
		c. Mark across bottom (raw edge) of hem with $\frac{1}{4}$" squares.
2. Sewing the Cross Stitch.	2.	a. Start stitching from left edge of material, to the right.
		b. Insert needle into the fabric on the upper left corner of the first $\frac{1}{4}$" square (knot will be hidden under the material).
		c. Pull needle and thread through the material.
		d. At the bottom edge of the hem, insert needle in material right to left in center of the second square. Make certain does not penetrate the material.
		e. Insert needle in upper right corner of the third square, and bring out point of needle at the upper left corner of the square.
		g. Pull needle and thread through the material.

h. Continue procedures followed in par d thru g above, across the length of material to form an even cross pattern.

i. Make certain that stitches are not visible on face side of material.



Step 1

Step 2

Step 3

Step 4

Figure 18 - Construction of the Cross Stitch

NOTE: PAGE 8.11 HAS BEEN OMITTED BUT NO MATERIAL IS MISSING.

CROSS STITCH

(TROUSER CUFF)

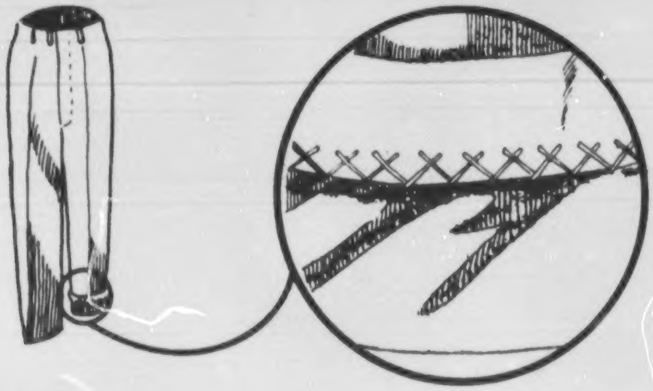


Figure 19

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FELLING STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, your instructor will discuss the purpose, use and construction of the felling stitch; to include stitch length and intervals. He also will give a demonstration step-by-step in the construction of the felling stitch. After the demonstration the students will perform a practical exercise practicing how to construct the felling stitch.

B. Objective - The objectives in these hours of study is to give the students a working knowledge of the use and construction of the felling stitch, also a thorough grounding of the construction of the felling stitch.

II. Presentation

A. Definition of the felling stitch

The felling stitch is a form of blind stitch used in most instances to hem or to hold two pieces of material together where a machine cannot satisfactorily operate. For example, sleeves on wool jackets. It is possible to sew the lining by machine; however, the machine sewn stitch through the sleeve, would not present a neat military appearance.

B. Uses of the felling stitch

The felling stitch is used to sew the lining and liners into wool coats and jackets. In some cases, the waistband on trousers are felled in by hand.

C. Where the felling stitch can be used only:

The felling stitch can be used only on smooth edges where no thread has become unraveled. The rough edges of the fabric is turned under before stitching.

D. The length of the felling stitch is determined by the job it has to perform; normally, the felling stitches should be 1/8 of a inch apart, depending on the type of work to be done.

FELLING STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the students will receive a thorough grounding of procedures used in the construction of the felling stitch. It is imperative that the students be aware of the importance of knowing the correct procedures used in the construction of the felling stitch.

II. **Study Reference: TM 10-267, pages 6 & 7, figure 5.**

III. Supplies, Tools and Equipment required

Hand Needles (ample supply)

Matching thread (ample supply)

Beeswax (ample supply)

Salvage material (ample supply)

Shears (one per student)

Thimble (one pair per student)

IV. Direction to the students

Follow the step-by-step procedures outlined in paragraph VI B. If you have any question regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

A. The performance standards (A, Par VI) are set up to be used following the job breakdown, are to enable the instructor in checking the students performance and inspecting the final results for grading purposes. The performance standards that will be used in checking the work of the students upon completion of the breakdown "B" below are as follows:

1. Check the correct length of the stitch.

2. The felling stitch must be smooth, even and almost completely hidden in the material.

B. The procedures for constructing the felling stitch are listed to the left of the page in the breakdown below. The key points which correspond, in number to the procedures for each breakdown are listed to the right of the page.

Construction of the Felling Stitch.

1. Prepare material.	1. a. Select a piece of material 8x8 inches square. b. Place material on table face up. c. Measure and mark down from top of material 2" and draw a straight line across length of material. d. Draw a second line from the edge of material ½", and parallel with the first marking of 2". e. Measure and mark ¼" from two 2" mark, and ¼" from the ½" mark (at this time you should have four (4) marked lines parallel with each). f. Measure and mark across length of material in preparation for basting stitch. g. Fold material on 2" mark, and apply the basting stitch across length of material. f. Fold material on the ½" mark, turning under the raw edge. Apply the second row of basting stitches on the ¼" mark, from the folded edge.
2. Sewing the Felling Stitch.	2. a. Start from right to left.

b. Insert needle under fold of raw edge 1/8" in, and 1/16" deep from fold.

c. Pull needle and thread through material. Knot of thread should be hidden between materials.

d. Insert needle into material below the last stitch diagonally to the left, and so that it partially penetrates the single layer of material below the folded edge, and completely penetrates the folded edge, approximately 1/16" deep.

e. Continue to stitch, and make certain each stitch length is the same. Follow procedures in para c and d above.

f. Sew across the length of the material.

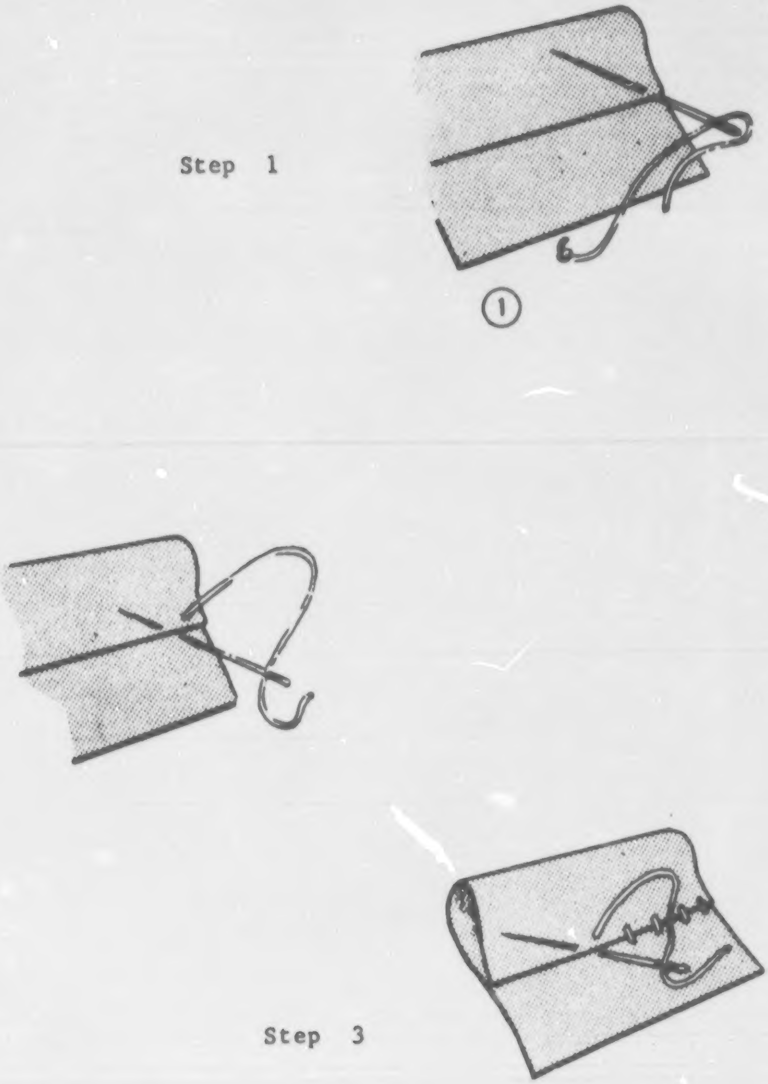
Step 1
①
Step 2
Step 3

Figure 20 - Construction of the Felling Stitch

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STOAT STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, the instructor will discuss the purpose, use and construction of the stoat stitch; to include the fundamentals of applying the stoat stitch for repair of heavier type clothing or textile materials. The instructor will also demonstrate by following a step-by-step procedure in construction of the stoat stitch. After the demonstration, the students will perform a practical exercise in the repair of clothing and textiles by use of the stoat stitch.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the use of the stoat stitch; given the appropriate tools, supplies and materials, the student will be able to construct the stoat stitch in such a manner that the stitch length, depths, intervals and workmanship meet the minimal deviation standards established by the school.

II. Presentation

A. Characteristics of the Stoat Stitch

1. Invisible - when repair is complete the threads of the stoat stitch should not be visible on face or top surface of the material.

2. Smoothness - it should not have any puckers on either side of the material.

3. It should be constructed with the proper amount of tension on the thread, so that the repaired area of the garment retains the original

appearance as well as the serviceability.

B. Adaptability of the stoat stitch.

1. The stoat stitch can only be used to repair only minor repairs to rips and tears, providing there is no material missing from the damaged area.

2. The stoat stitch can be used with best results if the items are constructed of heavy material such as blankets.

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STOAT STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the student will be able to observe and learn the proper procedures in the construction of the stoat stitch. It is important that the student know the correct procedures followed in applying the stoat stitch and when this type stitch will be used on items of clothing and textiles.

II. Study Reference: TM 10-267, pages 8 and 9, figure 8.

III. Supplies, Tools and Equipment required:

Hand sewing needles (ample supply)

Beeswax (ample supply)

Thread (ample supply)

Shears (one per student)

Thimble (one per student)

Material (ample supply)

IV. Direction to the students

A. The student will listen, observe, and ask questions during the instructors demonstration.

B. When in doubt the student will call on the instructor for assistance.

V. Performance Standards

The performance standards are set up to be used following the job breakdown (Par V) is to enable the instructor in checking the students' performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The following is the performance standards that will be used in checking the work of the student upon completion of his practical exercise:

1. The stitches should be evenly spaced, 1/16" from edges of damaged area and 1/8" apart.

2. Stitches should begin and end ¼" beyond the ends of the damaged area.

3. Stitches should be applied with the proper tension (not too tight or too loose).

4. Stitches should not be visible from face side of material.

B. The procedures for constructing the stoat stitch are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

PRODUCTION STEPS	KEY POINTS
Construction of the Stoat Stitch.	
1. Prepare material.	1. a. Select a piece of heavy material 8x8 square (salvaged blanket). b. With scissors cut a four (4) inch slit in the material.
2. Sewing the Stoat Stitch.	2. a. From underside of material stitch from right to left. b. Insert needle into the material 1/16" from edge of the slit, and ¼" from end of tear. c. Needle is to pass through the center of the material, and emerge 1/16" from opposite edge of slit. d. Repeat procedures in par a, b, c, above, stitches should be approximately 1/8" apart. Stitch across the length of the slit and ¼" beyond. e. Apply enough tension to the thread to bring the edges of the slit together (tension too tight will cause material to pucker, too loose will cause an opening in the slit).

f. Stitches to be applied evenly, and all of the same size. Not visible on the face side of material.

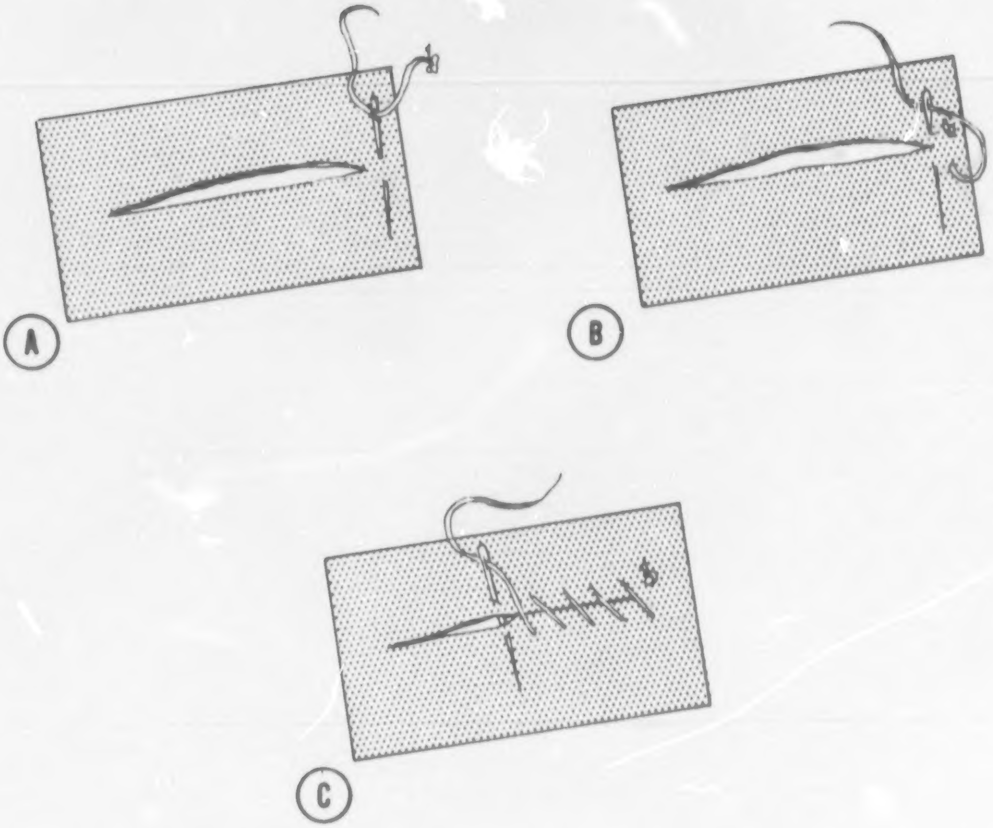


Figure 21 - Construction of Stoat-stitch

WEAVING STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During the next period of instruction, the instructor will discuss the purpose, use and construction of the weaving stitch; to include the fundamentals of weaving heavier clothing or textile material. He will also give a demonstration, step-by-step, in the construction of the weaving stitch. After the demonstration, the students will perform a practical exercise practicing how to repair textile items using the weaving stitch.

B. Objective - The objectives in these hours of study is to give the students a working knowledge of the uses and construction of the weaving stitch, also a thorough grounding of the construction of the weaving stitch.

II. Presentation

A. Characteristics of the weaving stitch

1. Invisible - the threads should not be seen from either side of the material.

2. Smoothness - It should not have any bulges.

3. It should be so constructed that will not come loose at the slightest pressure.

B. Adaptability of the weaving stitch.

1. The weaving stitch can only be used to repair minor rips and tears, providing there is no material missing from the rip or tear.

2. The weaving stitch can be used with better results if the garment is constructed of a heavy material, such as an OD blanket or AG 44 green uniforms.

C. Thread used for the construction of the weaving stitch.

1. The thread should be of a closely matching color to the garment on which it is being used.

2. Use a size 40/3 yarn.

WEAVING STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the students will receive a thorough grounding of the procedures used in the construction of the weaving stitch. It is imperative that the students be aware of the importance of knowing the correct procedures used in the construction of this type stitch.

II. **Study Reference: TM 10-267, pages 6 & 8, figure 6.**

III. Supplies, Tools and Equipment Required

Hand Needles (ample supply)
Beeswax (ample supply)
Matching Thread (ample supply)
Shears (one pair per student)
Thimbles (one per student)
Salvage Material (ample supply)

IV. Direction to the Students

Follow the step-by-step procedures outlined in paragraph VI B. If you have any questions regarding this practical exercise do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A par VI) are set up to be used following the job breakdown; to enable the instructor in checking the students' performance and inspecting the final results for grading purpose.

VI. Job Breakdown

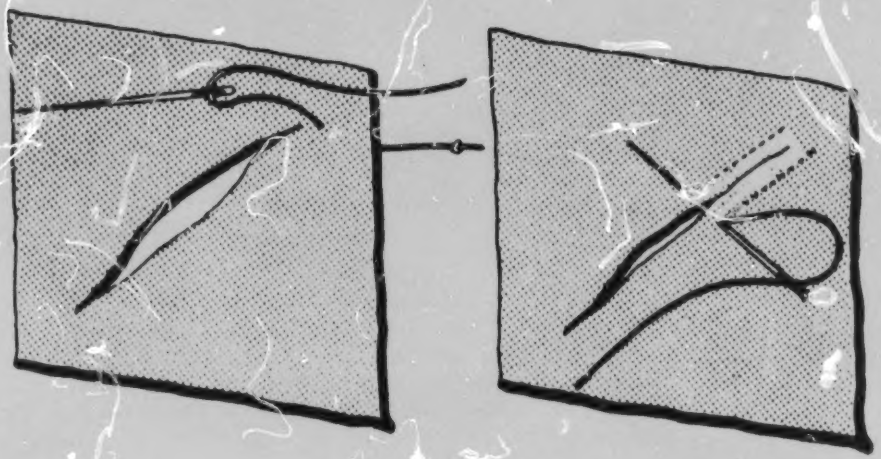
A. The performance standards that will be used in checking the work of the student upon completion of the breakdown "B" below are as follows:

1. Weaving stitch must be hidden.
2. The thread must match the material.
3. The weaving stitch should be smooth, even, strong and hardly visible.

B. The procedures for constructing the weaving stitch are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

Construction of the Weaving Stitch

1. Prepare material.	1. a. Select a piece of material 4x4 inch square. b. With scissors cut a slit in the material approximately 2 inches in length.
2. Sewing the Weaving Stitch.	2. a. Insert the needle in fabric about ¼" from the edge, and ½" from the end of the slit in the material, so that it passes through the center of the weave (if thin material is used, it will be necessary to weave the needle in and out of the fabric). b. Point of needle should emerge ¼" on opposite edge of the slit. c. Pull needle and thread through the material. d. Reinsert needle very close to point where it emerged, and pass it through to other side of slit approximately ¼" deep from edge. Stitches should be 1/16" apart. e. Gently pull rip or cut (slit) together, taking care not to form puckers or pulls in the material. f. Repeat stitching until damaged area is completely covered and ½" beyond the damage is stitched. g. Stitching should not be visible when completed.



Step 1 Step 2

Figure 22 - Construction of the Weaving Stitch

WHIP STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During the next period of instruction, the instructor will discuss the purpose and construction of the whip stitch. The whip stitch is used to hold raveled edges of the material in place. The instructor will demonstrate the proper procedures in construction of the whip stitch. After the demonstration, the students will perform a practical exercise in the construction of the whip stitch.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the use of the whip stitch, given the appropriate tools, supplies, and materials, the student will be able to construct the whip stitch in such a manner that the stitch length, depth, intervals, and workmanship meet the minimal deviation standards established by the school.

II. Presentation

A. Characteristics of the whip stitch

1. When properly applied to the material, the edges of the material will be secure and protected from raveling.

2. When completed the whip stitch serves the same purpose of the overedging stitch applied by a special purpose machine.

3. It should be constructed with the proper amount of tension on the thread to prevent rolling of edges if too tight or becoming ineffective

for the purpose intended if too loose.

B. Adaptability of the whip stitch

1. The whip stitch can be used on most types of material light or heavy when required to protect raw edges from raveling.

2. The whip stitch can be used effectively to construct a buttonhole, it will be applied on the raw edges of the buttonhole before applying the buttonhole stitch.

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WHIP STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the student will be able to observe and learn the proper procedures in the construction of the whip stitch. It is important that the student know the correct procedures followed in applying the whip stitch and when this type stitch is used on items of clothing and textiles.

II. Study Reference: TM 10-267, Page 12; Figure 10.

III. Supplies, tools and equipment required:

Hand sewing needles (ample supply)
Beeswax (ample supply)
Thread (ample supply)
Shears (one per student)
Thimble (one per student)
Material (ample supply)

IV. Direction to the students

A. The student will listen, observe, and ask questions during the demonstration by the instructor.

B. When in doubt during the practical exercise, the student will call on the instructor for assistance.

V. Performance Standards

The performance standards are set up to be used following the job breakdown (Par V) is to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The following is the performance standards that will be used in checking the students' work upon completion of his practical exercise.

1. Raw edges of the material should be neatly cut and trimmed.

2. Length of stitch and interval between stitches and in uniformity across the length of the material.

3. Proper tension used on thread (if too tight the edges will roll).

4. Thread should be knotted at the starting point and tacked at the end of the material.

B. The procedures for constructing the whip stitch are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

Construction of the Whip Stitch.

1. Prepare material.	1. a. Select a piece of material 8x8 inches square. b. Cut material in half to 4x8 inches. c. Cut and trim raveled edges of material.
2. Sewing the Whip Stitch.	2. a. Start at the right edge of material, and sew from right to left. b. Insert needle through material 1/16" to 1/8" below edge of material. c. Pull needle and thread through the material. d. Pass needle over edge of material, and reinsert needle through material 1/8" to left of the first stitch.

e. Continue stitching across the length of material as described in par b, c, and d above.
f. Do not apply too much tension on the thread. This will cause the edges of material to roll.

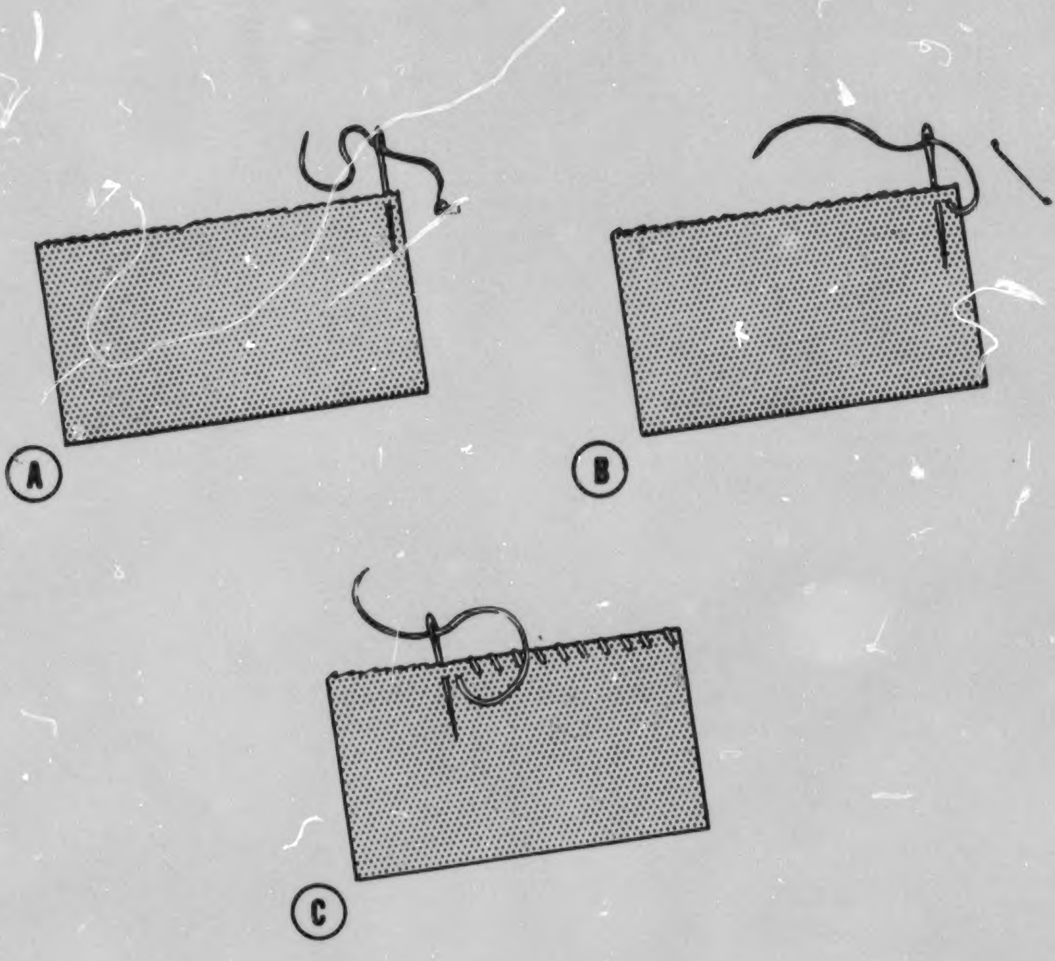

Figure 23

Construction of Whip-stitch.

BUTTONHOLE STITCH

PRECIS

I. Introduction

A. Orientation and Motivation

During the next period of instruction, the instructor will discuss the purpose and construction of the buttonhole stitch as used in making buttonholes in jackets. He will also give a demonstration, step-by-step, of the procedures used in constructing a buttonhole. After the demonstration, the students will perform a practical exercise practicing how to make this type of repair.

B. Objective - The objectives in these hours of study is to give the students a working knowledge of the uses and construction of the buttonhole stitch also a thorough grounding of the uses and construction of the buttonhole stitch.

II. Presentation

A. Characteristics of the Buttonhole Stitch

1. Evenly spaced - stitches must be 1/16" apart from each other.
2. Proper depth - stitches should be 1/8" in depth.
3. Knot formed properly - knots must be formed in an even line.

B. Preparing the material

1. Cut buttonholes.
2. Apply an over-hand stitch around buttonhole to hold edge in place.
    a. Use size 40/3 thread.
    b. Use color thread to blend with material.
    c. Make over-hand stitch 1/8" apart.

C. Construction of the buttonhole stitch.

1. Thread

a. Use approximately same size thread.

b. Use matching color thread.

c. Wax the thread.

2. Procedure

a. Hold buttonhole with eye away from you.

b. Insert the needle at the base of the buttonhole between the two pieces of material to hide the knot.

c. Reinsert the needle 1/16" away and at the same level as the proceeding stitch.

d. Loop the thread strand by the eye of the needle from left to right around the point of the needle.

e. Pull the needle out of the material and apply enough pressure to form a knot on the edge of the buttonhole.

f. Repeat the procedure around entire length of buttonhole.

3. Tacking the buttonhole.

Tack by making three stitches at the same place, and holding both sides of the buttonhole.

BUTTONHOLE STITCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the students will receive a thorough grounding of the procedures used in constructing a buttonhole. It is imperative that the students be aware of the importance of knowing the correct procedure used in this type of repair.

II. Study Reference - **TM 10-267, pages 10 & 11, figure 9.**

III. Supplies, Tools, and Equipment required

Hand Needles (ample supply)
Matching Thread (ample supply)
Beeswax (ample supply)
Shears (one per student)
Salvage Material (ample supply)
Thimble (one per student)
Buttonhole cutter (one per class)

IV. Direction to the Students

Follow the step-by-step procedures outlined in paragraph VIB. If you have any questions regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards (A par VI) are set up to be used following the job breakdown is to enable the instructor in checking the students' performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the work of the students upon completion of the breakdown "B" below are as follows:

1. The thread must match the material.
2. The buttonhole stitch must be smooth, even and tight.

B. The procedures for constructing a buttonhole are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedures for each breakdown are listed to the right of the page.

Construction Buttonhole Stitch.

1. Prepare material.	1. a. Select a piece of material 2x2 inches square (double thickness). b. With cutter, cut out a buttonhole in center of the material (adjust the cylinder of cutter to cut the buttonhole at 1¼" length). c. Material should be face up and even of the buttonhole towards the repairman. d. Whip stitch around the edges of the buttonhole to hold raveled edges of the material together.
2. Sew Buttonhole Stitch.	2. a. Start buttonhole stitch by inserting needle between layers of material in left side of buttonhole base so that needle will emerge 1/16" to 1/8" from edge. b. Pull needle and thread through the material. c. Insert needle next to the first point of entry, so that needle touches thread of the preceeding stitch. d. Pull point of needle through material, and loop thread right to left around point of needle. e. Pull thread through the material, so that a small knot or loop forms on inside edge of buttonhole.

f. Repeat procedures described in par a thru e above, stitching around the buttonhole in a counter-clockwise fashion to the starting point.

g. Tack the base of the buttonhole, by applying 3 stitches across the edge of buttonhole approximately ¼" in length.

h. All stitches should be evenly spaced, and of the same length or depth.

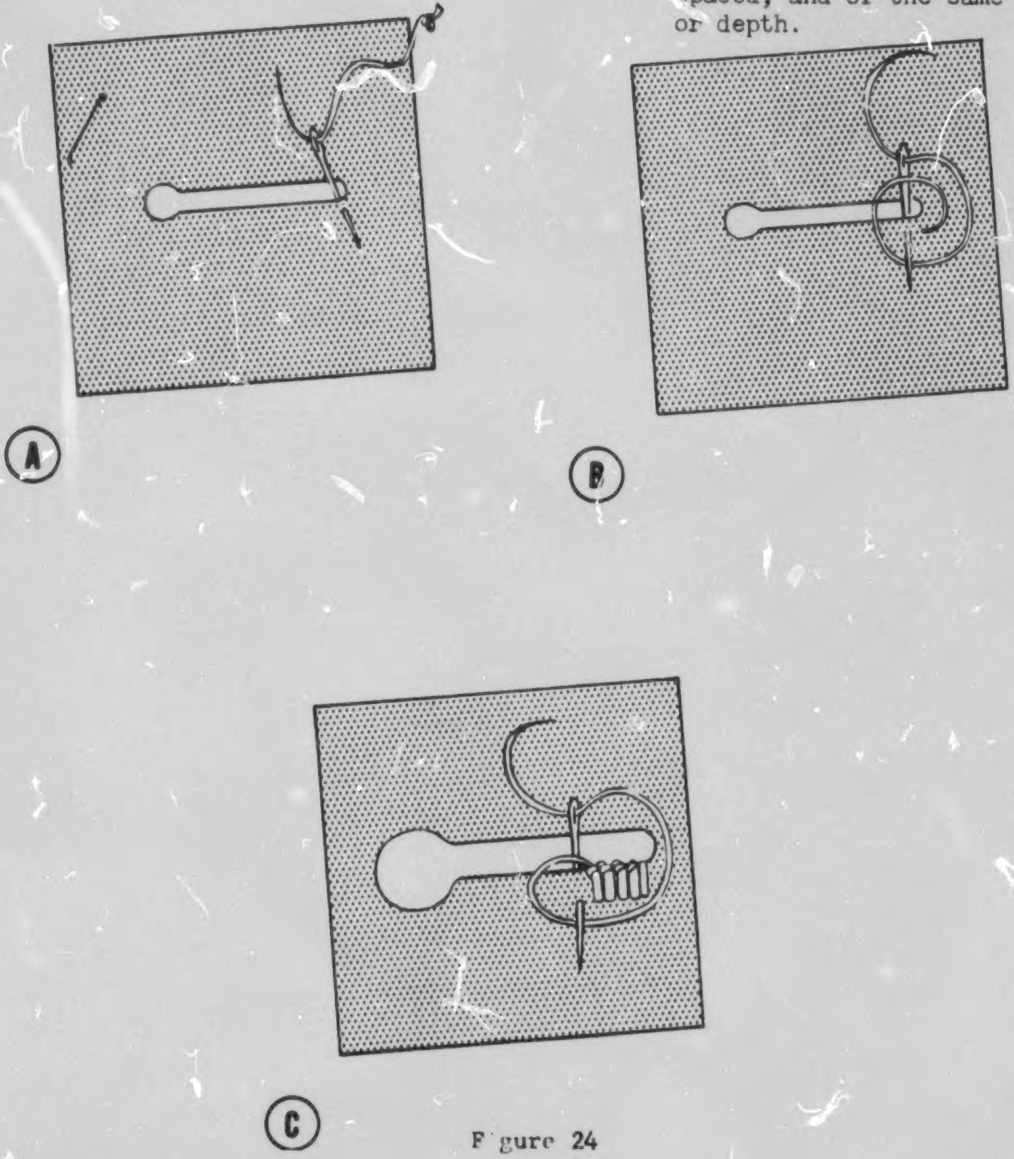

Figure 24

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SECTION IX

ARMY MAINTENANCE SYSTEMS AND RECORDS

PRECIS

I. Introduction

A. Orientation and Motivation

1. Maintenance in the Army is a multimillion dollar operation dispersed from the depots in the heart of the Continental United States to mobile repair teams overseas.

2. It supports the world's most mechanized army by insuring that its equipment is serviceable and ready to meet the demands of a cold war or a nuclear cause.

3. The purpose of maintenance today, is the same as it was during the war of the revolution, and that is to keep the equipment in the hands of the forces operable and the forces in a condition of readiness.

II. Objective

As a result of this instruction, the student will be able to discuss the Army Maintenance System and effectively utilize pertinent maintenance publications to carry out his mission, and given appropriate references, maintenance forms and records, will be able to complete the necessary forms and post maintenance records as required by the operator.

III. Presentation

A. Maintenance or Preventive Maintenance

1. Definition - The care taken, or work done, to keep any equipment or material in a good working condition. The detection and correction of potential failures either before they occur or before they develop into major defects.

2. Responsibility - The responsibility for the performance of preventive maintenance services rests not only with operators; but, with the entire chain of Command.

B. The Army Maintenance System

1. The maintenance system is organized to provide maintenance support at all levels of Command to insure adequate maintenance support to the users of equipment. This support must be accessible to the users to provide maximum service and responsiveness.

2. Maintenance support normally will be provided on an assigned mission area basis.

3. Maintenance Operations are divided into categories in order to:

a. relate maintenance operations to other military operations.

b. provide a basis for identifying organizations for maintenance operations in the Army.

c. facilitate the assignment of maintenance responsibilities to specific levels of Commands.

d. permit the orderly an efficient distribution of available maintenance resources.

4. The maintenance system is divided into four (4) categories:

a. organizational, direct support, general support, categories.

b. these categories define the degree of maintenance which can be performed by a unit, organization, or a maintenance facility.

c. maintenance operations performed on any item of material are assigned to specific levels of command in accordance with the primary mission, character, and mobility of the command involved.

d. organized maintenance.

(1) organizational maintenance will be performed at the unit in accordance with applicable Department of the Army publications.

(2) organizational mechanics will be required to inspect and assist with the preventive maintenance performed by the operator.

(3) operators will assist organizational mechanics in performing repairs or periodic maintenance services.

(4) each organization will have on hand or on order, its prescribed load of repair parts.

(5) organizational maintenance services will include inspecting, cleaning, lubricating, and making certain adjustments. Personnel performing these services will use tools, test equipment, and replace minor parts.

e. Direct Support Maintenance

(1) Direct Support Maintenance units provide support where feasible by on-site repair, replacement of assemblies and components, delivery of parts to the user, and provide technical assistance.

(2) they provide direct exchange services by supplying to the user serviceable items for unserviceable equipment from the user which cannot be repaired on-site to an activity where repairs can be accomplished, or to a collection or salvage facility.

(3) they assist in the performance of maintenance inspections of equipment and of organizational maintenance operations of the user to ascertain the condition of equipment and the effectiveness of organizational maintenance.

f. General Support Maintenance

(1) General Support Maintenance units receive equipment for repair or modification from the direct support unit, collection points, supply units, and installations for which they are assigned maintenance support responsibilities.

(2) they repair end items, components, and assemblies for return to the supply system or maintenance float and when required, to the user. Many special types of equipment and tools and the services of general and technical mechanics are required to perform this maintenance.

g. Depot Maintenance

(1) Commanders of Army Field Commands are responsible for programming depot maintenance support of material in oversea areas. Depot maintenance is performed by units located at fixed installations in the rear areas.

(2) the performance of Depot Maintenance will include reclamation or complete reconditioning of material and the limited manufacture of parts and equipment.

(3) the mission of depot maintenance is to completely overhaul units to be placed in stock. In war time, depot maintenance will be discontinued and maintenance limited to overhaul of components and major assemblies in oversea theaters.

(4) Repair will be accomplished under the inspect, repair only as needed (IROAN) principle. General Support and Depot Maintenance will be accomplished to permit return of an item to the supply system.

(5) each maintenance activity will perform all authorized maintenance for which it is responsible. When operational necessity requires, the Commander having jurisdiction over both the supporting and the supported unit may authorize the next higher category of maintenance to be performed by the supported unit.

C. Forms and Records

1. DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

a. DA Form 2404 provides a standard procedure for temporarily recording:

(1) equipment faults found to exist at time of the operator's daily inspection and service period PM services, inspection of equipment by maintenance activities and spot check inspections of equipment.

(2) the results of Command Maintenance Inspections (CMMI) when desired as a work sheet only.

(3) the results of equipment serviceability criteria tests and checks prescribed by regulations.

b. DA Form 2404 must be used in conjunction with the appropriate technical manual to insure that proper servicing procedures are followed, and that faults recorded are on the basis of established serviceability standards.

c. only deficiencies or short comings will be recorded on this form.

(1) deficiency - a material defect or malfunction that renders an item inoperable, results in an unsafe or unhealthy condition to individuals or serious damage to the item, causing unacceptable inaccuracy.

(2) shortcoming - a material defect other than a deficiency that must be corrected to increase efficiency or to make the item completely serviceable.

2. DA Form 2407 (Maintenance Request)

Purpose - is designed to provide maximum maintenance information with a minimum effort at all management levels.

a. The purpose of DA Form 2407 is to:

(1) Request maintenance services.

(2) Report accomplishment of modification work orders.

(3) Record maintenance services performed.

(4) Serve as a source document for maintenance data collection.

b. Use

(1) At the organizational level, DA Form 2407 will be used for:

(a) Requesting repairs and maintenance services.

(b) Reporting accomplishment of modification work orders.

(2) At the support maintenance level, DA Form 2407 will be used for:

(a) Requesting repairs or services of another maintenance unit or activity within the same or at a higher category.

(b) Recording the services performed and repair parts used in support of equipment.

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D. Technical Manuals

1. To increase the effectiveness of the Army Maintenance System, there are many technical manuals which have been published for our use.

2. Operators and maintenance personnel who are responsible for operating and maintaining equipment will be provided with technical manuals which will prescribe the services that they will be required to perform on the equipment.

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SECTION X

MATERIAL READINESS

PRECIS

I. Introduction

A. Orientation and Motivation

1. The purpose of this subject is to discuss the material readiness measurement system that has been developed and its impact on unit readiness evaluations and reports.

2. The Army's highest priority of effort during peacetime is to develop and maintain units that are ready for combat at all times. One of its most difficult problems is to measure the degree of readiness. Unit readiness is a combination of men and equipment and the degree of readiness is equally dependent upon the state of personnel training and the operational capability of the equipment. It is the operational capability of the equipment, that is material readiness, with which we are concerned its measurement and its impact on unit readiness.

B. Objective

As a result of this instruction, the student will be able to discuss the Material Readiness Program, and given appropriate references and equipment, will be able to complete the necessary forms and inspection required of the operator in the Material Readiness Program.

II. Presentation

A. During this period you will see a training film on material readiness and how a commander evaluates his equipment and personnel to determine its state of readiness or capability for performing its assigned mission. Particular attention should be placed on the method of computing an equipment profile since it may be a requirement upon your assignment to your respective units.

B. In thinking about material readiness conditions, it soon becomes apparent that the determination on a single piece of equipment probably is not too valid. An old "junker" may actually run for months without extensive maintenance whereas, a new piece of equipment (as in the case of some automobiles) may be a "lemon" and spend most of its time in the shop.

C. Equipment Profile

An equipment profile is a 6 digit number which describes the serviceability of groups of like items. An equipment profile is stated in terms of GREEN, AMBER, and RED percentage of a total quantity authorized.

Example:

Item	Authorized	On/Hand	Green	Amber	Red
A	50 ea	50 ea	35	10	5

Green % 35/50 = 70%

Amber % 10/50 = 20%

Red % 5/50 = 10%

Profile is 702010

Note: Percentage is derived by the number of items GREEN, AMBER, or RED by the total authorized. The total must equal 100%. Percentage figures less than two digits such as 5% and 1% are written with a zero (0) preceeding the percentage. In this case they are written as 05 and 01.

D. Unit Equipment Serviceability Profile

1. A unit equipment profile is a term describing the overall level of equipment serviceability of selected items of equipment authorized a unit.

This profile of selected equipment is a 6 digit number denoting, serviceability level in percentage of GREEN, AMBER, and RED.

Example:

Item	Authorized	On/Hand	Green	Amber	Red	Short
A	125	100	70	20	10	25
B	100	75	60	10	5	25
C	10	10	0	0	10	0
D	100	100	70	20	10	0
E	100	100	85	10	5	0
F	10	10	0	5	5	0
Total	445	395	285	65	45	50

GREEN %	285/445	= 64%
AMBER %	65/445	= 15%
RED %	95/445	= 21%

Profile 641521

2. Equipment which constitutes a TOE shortage or is unavailable to the unit for inspection for a period of time exceeding 24 hours or is removed from the operational control of the unit will be categorized as RED.

E. Conditions of Equipment Serviceability

1. The conditions of equipment serviceability (C Ratings) provide a means of categorizing actual unit equipment serviceability profiles.

2. The following table relates five minimum interim standard unit equipment serviceability profiles with five established C-Ratings.

STANDARD	
851005	C-1
702010	C-2
553015	C-3
404020	C-4
Below 404020	C-4

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F. To determine a C-Rating for an actual unit equipment serviceability profile, the actual GREEN percentage must equal or exceed the standard GREEN percentage and the actual RED percentage must not exceed the standard RED percentage of the category. Some examples are:

ACTUAL UNIT EQUIPMENT SERVICEABILITY

PROFILE

851203	C-1
752500	C-2
582715	C-3
641818	C-4
601030	C-5

G. Reporting Procedures

1. Selected items of equipment as listed in the appendices of AR 750-10 and TM 38-750 will be reported to higher headquarters reflecting equipment readiness of units so designated.

2. Although you may not be directly involved in the reporting system, you still need to know how it works, how it affects your unit, how it will be used so that you can understand the need for extreme care and accuracy in the application of the criteria.

H. Equipment Serviceability Criteria

1. Purpose of this publication is a guide used to rate and evaluate equipment.

2. Equipment Categories:

a. GREEN - combat ready equipment free of any condition limiting the reliable performance of its primary mission for a period of approximately 90 days.

b. AMBER - combat equipment possessing limiting conditions which may restrict a reliable performance of its primary mission.

c. RED - combat equipment unable to perform its primary mission immediately or possessing an unacceptable reliability for sustained performance (90 days) of its primary mission.

2. The needed accuracy and uniformity, in reporting material readiness, is insured through use of Equipment Serviceability Criteria to guide the repairman in inspecting, evaluating, and classifying an item for a report.

3. You as Clothing and Textile Repairman will help generate the material readiness reports and start them on their climb. When you have finished your course, and are on the job, making these inspections on your equipment "for keeps" remember, the material readiness report can be no more accurate when it reaches the top than the information that you feed in at the start.

SECTION XI

INSPECTIONS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the Command Inspections, Command Maintenance Management Inspection, Preventive Maintenance Inspections and the Technical Inspections.

2. Inspection is the means by which any soldier determines the condition of assigned equipment that he is responsible for.

3. Inspection is also the means by which a commander determines the condition of equipment of the unit because:

a. Each commander is responsible for maintaining equipment in his command in a condition that will insure adequate performance for accomplishment of the unit's mission.

b. To insure this performance he must have adequate inspection.

B. As a result of this instruction, the student, given the appropriate references, will be able to explain the importance of inspections in the maintenance program; explain the operator's role in preparing for a CMMI; name the types of inspections and numerical and adjectival ratings; distinguish between shortcomings and deficiencies and name what shortcomings and deficiencies can be corrected as an operator.

II. Presentation

A. The Command Inspection - Command inspections are either formal or informal.

1. The Formal Command Inspection

a. The Formal Command Inspection is conducted by the commander. His inspection party may include selected members of his staff along with technical assistants for inspection of specialized areas, normally these are of NCO grade.

b. The purpose is to assure the commander that personnel and equipment of his command are up to his prescribed standards. With personnel he will look for such indicators as morale, discipline, "esprit de corps", and technical proficiency.

c. The inspection of equipment will answer such questions as:

(1) Is the equipment correctly and economically used?

(2) Is there evidence of neglect or abuse?

(3) Is all authorized equipment on hand or on requisition?

(4) Is unserviceable equipment promptly repaired or disposed of?

(5) Is there excessive deadline of equipment?

(6) Are authorized repair parts on hand and adequate?

(7) Are prescribed preventive maintenance procedures being followed?

(8) Are maintenance personnel trained and proficient?

d. Obviously an inspection of this scope requires some advance notice and time for preparation.

2. The Informal Command Inspection

a. This inspection is made without prior notice. The commander personally participates and the inspection is conducted at any convenient time or place.

b. The inspection follows no set procedure. It will be as comprehensive as the commander desires, but often may cover only specific areas, or he may program different areas on each week or on each inspection as his plans call for.

c. As with the formal inspection, technical specialists may assist by inspecting in their specialized areas. NCO's with MOS 43J or 43K frequently perform in this capacity.

d. As you have already learned the DA Form 2404 is the "Work Sheet" used in the inspection of equipment.

e. The Informal Command Inspection is designed to provide the commander with first hand information on day to day condition of his unit and equipment, and the training and proficiency of his personnel.

f. Preventive Maintenance techniques and adherence to prescribed procedures are areas of primary interest to the commander during the Informal Command Inspection.

B. The Command Maintenance Management Inspection

1. The second type of inspection is the Command Maintenance Management Inspection, commonly known as the CMMI. Notice the word Management. The management of maintenance is a continuing and an important task of higher level commanders.

2. The CMMI is used by Army Commanders to determine the adequacy of maintenance activities and procedures within their units, and more important to insure conformance with applicable maintenance directives.

3. The CMMI is designed to provide commanders with indications of the maintenance operational efficiency of subordinate units and activities.

4. This is accomplished through inspection of statistically sound sample quantities of material to determine its physical condition and to determine the adequacy or inadequacy of maintenance that relates to its condition.

5. The CMMI alone cannot, and is not designed to determine the overall operational readiness of units or activities.

6. Each company size unit, separate detachment, or similar activity will be inspected for performance of organizational maintenance.

7. Support maintenance units will be inspected to determine adequacy and proficiency of maintenance support to the supported units.

8. Scoring and Rating

a. The indication of material maintenance and the evaluation of the proficiency and effectiveness of organizational and support maintenance will be determined by the CMMI team commander. He will submit a narrative report summarizing all aspects of the maintenance management inspection.

b. A numerical rating of the inspected unit is based on a total deficiencies and shortcomings found during the inspection and upon the evaluation of specific areas prescribed in AR 750-8, par 44. The numerical rating is computed by the inspection team chief.

c. A rating of satisfactory or unsatisfactory is based on the numerical rating with 70-100 being satisfactory and 69 or below being unsatisfactory.

9. CMMI teams are made up of administrative and technical specialists and usually include NCO's with the MOS 43J and/or 43K.

C. The Preventive Maintenance Inspections

1. The instructor will discuss two inspections which you will be closely associated with and vitally concerned. In many ways these are the most important and the most basic of all. The preventive maintenance inspections are the foundation of the Army's maintenance inspection system.

2. The first of the two is the Operators Daily Inspection, the before, during, and after operation inspections. In a real sense this inspection is the most important. It affords an opportunity to discover and correct most mechanical failures before they ever happen.

a. To ignore the need for this inspection is gross negligence. However, it is frequently performed as carelessly as to be all but ignored.

b. The operator's daily inspection should be supervised to insure proper performance. Without supervision, it will more often be too carelessly done.

c. This inspection will be performed by you and will be discussed at greater length later on in your training.

3. The Periodic Scheduled Inspection

a. The second preventive maintenance inspection that will be considered is the periodic scheduled inspection. This inspection is performed whether needed or not.

b. These inspections are performed monthly or after each 100 hours of operation, ans semi-annually or after 500 hours of operation.

c. Be assured, be warned in performance of the inspections themselves, a passing over lightly or quickly, if practiced generally will undermine your whole maintenance effort.

D. The Technical Inspection

1. The last inspection the instructor will discuss is the technical inspection, commonly referred to as the TI.

2. The technical inspection as two principle uses:

a. Each piece of equipment going into a support maintenance shop for repairs must have a TI to determine the nature and extent of repairs needed.

b. It determines what parts or assemblies are not working properly and whether adjustment, repair, or replacement is indicated. It should also reveal any unserviceable condition resulting from abuse or neglect.

c. The TI is a basis for ordering replacement parts which are not on hand.

d. This type of inspection can be made only by a person technically qualified to examine and judge the item undergoing the TI.

e. Another use of the technical inspection is for the purpose of classification of items being returned to the supply system.

f. It is the means through which item supply managers and inventory managers keep informed on the serviceability of used stock and the economic repairability of unserviceable stock.

g. Each item being returned to the supply system must be given a TI. This determines if the item is serviceable. If the item is unserviceable it determines the degree of unserviceability and probable cost of repair. The inspectors repair cost estimate is then related to the acquisition cost for determining whether or not the item is economically repairable. (Repair cost limitations on QM Equipment items are prescribed in AR 750-428).

Operator Maintenance, Adjustments, and Operation of Clothing and Textile Repair Sewing Machines

Note to Students:

This section contains the instructions of operator maintenance, adjustments and operation of clothing and textile repair sewing machines. Listed below to the left of the page are the sewing machine models that will be discussed during this period of instruction. To the right of the page are the related models which you may encounter in the Army as textile repairmen. However, regardless of the model with which you encounter, you will find that the operator maintenance, adjustments, and operation procedures will have minor or no changes.

Models	Related Models
31-15 (Light Duty Machine)	331K1; 331K4
47W70 (Darning Machine)	--
246-5 (Overedger)	246-K-42; 246-K-43, 246-K-45, 460-12 thru 22.
175-60/61 (Button Machine)	175-62

SECTION XII

INTRODUCTION TO CLOTHING AND TEXTILE REPAIR SEWING MACHINES

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this hour of instruction the instructor will discuss the description, operating features, tabulated data and operator's controls of clothing and textile sewing machines. (Models 31-15, 47W70, 246-5, and 175-60/61.)

2. The instructor will also discuss the class, variety, and sizes of needles used with each sewing machine, thread twist and codes will also be discussed.

B. Objectives

As a result of this instruction, the student, given appropriate references and sewing machines, will be able to identify each sewing machine by name and model number, describe the operating features of each machine by stating the type of work each machine is designed to sew, locate and name the major assemblies of each machine. Locate and describe the operator's controls by stating the purpose of the motor switch, motor clutch pedal,knee lifter, hand lifting lever, starting lever treadle, foot lifter threadle, button clamp opener and thread nipper; given needle and thread charts, be able to indicate the appropriate class and variety of needles used with each sewing machine, distinguish between the various sizes of thread, in accordance with thread codes, determine the left or right twist of thread, and select the right combination and thread size.

II. Presentation

A. Model 31-15 Sewing Machine

1. Description

a. Model 31-15 sewing machine consists of an alternating current motor: a machine head and sewing stand.

b. The motor is bolted to the underside of the stand top and is belted to the machine by a ¼ inch, round, leather belt, and has a clutch and brake assembly.

c. The head is composed of the bed, the arm, and the balance wheel. The bed casting supports the arm assemblies and contains the driving or oscillating shaft, the shuttle race assembly, and the feeding assemblies.

d. The arm is a housing which contains the upper driving assembly and supports the face assemblies.

e. The face assemblies are the needle bar, presser bar and the thread take-up assemblies.

2. Operating features.

a. The model 31-15 sewing machine is used for general duty or tailoring work.

b. The oscillating shuttle carries a round bobbin and sews a lock stitch.

c. The presser foot may be raised by either the hand lifting lever or the knee lifter, the hand lifting lever locks the presser foot in its raised position. While the machine is stitching, the presser foot must be down, this will hold the material in contact with the feed dog.

d. The feed dog moves up and away from the operator, on each upstroke of the needle bar.

e. The machine may be used for darning, if the operator uses the hand lifting lever or the knee lifter to raise the presser foot just enough to allow him to move the material back and forth under the needle.

3. Tabulated data

a. The working space of the model 31-15 sewing machine is 10¼ inches.

b. The maximum speed is 2,200 stitches per minute.

c. The length of stitches is from (7) seven to thirty-two (32) stitches per inch.

4. Operator's Controls

a. A toggle or push switch is located on the left side of the machine stand.

b. Motor clutch pedal. The motor is connected to the motor driving pulley by a clutch, which is operated by the pedal or foot treadle. To connect the motor with the machine, press this pedal. If the brake on the clutch does not stop the machine promptly, it may be adjusted for a closer fit.

c. Knee lifter - The presser foot can be raised by operating the knee lifter to the right. This knee lifter connects with a knee lifting lever on the bottom of the head of the machine. A knee lifting lever push rod runs up and behind the arm of the machine to the presser foot.

d. Hand lifting lever, the presser foot may also be lifted and locked in its raised position by raising the hand lever to its highest position. After the presser foot has been locked in its raised position, it may be released by pressing the knee lifter to the right.

e. Stitch adjusting screw - The feed regulator thumb screw on the front side of the arm, regulates the length of the stitch. To measure the number of stitches being sewn to the inch, draw two parallel lines one inch apart on a small piece of cloth, sew across these lines and count the number of stitches between them. To change the length of stitch, loosen the regulator thumbscrew and move it down to lengthen the stitch, and up to shorten the stitch, when the desired length is being sewn, tighten the regulator screw.

5. Needle class and variety.

a. The size of the needle to be used is determined by the size and type of the thread used and type of material to be sewn. The thread must pass freely through the eye of the needle. Rough or uneven thread, or thread which for any reason does not pass easily through the eye of the needle interferes with the operation of the machine.

b. Requisition for needles must specify the number of needles desired, the class number and the variety number are expressed by placing the letter "X" between the two numbers, as "100 size 18, 16x87" needles. The class number describes the shank of the needle, and the variety number describes the length of the needle and the type of the point. The size describes the gauge of the needle and the needle eye.

c. The model 31-15 sewing machine requires a class 16, variety 87, needle. The size we use here at the school is 18, listed as the following 16x87 size 18.

6. Thread twist and codes

a. Because right-twist thread unwinds and breaks in a machine needle, left-twist thread should always be used for the needles of this machine.

b. To determine the twist of the thread, hold the end of the thread between the thumb and forefinger of the left hand, and with the thumb and forefinger of the right hand twist about an inch of the thread toward you. If the thread is left-twist, the strands will wind together; if the thread is right-twist, the strand will unwind.

c. Two numbers are used to designate a particular kind of thread. The first number describes the size or weight of the thread; the second number (to the right of the dash) indicates the number of strands twisted together to make the thread.

d. Requisition for thread should state the Federal stock number, description, code number, unit and quantity; (for example "FSN, Thread, machine, cotton, OD, left-twist, 40-3, 6,000 yards cone, 3 cones.")

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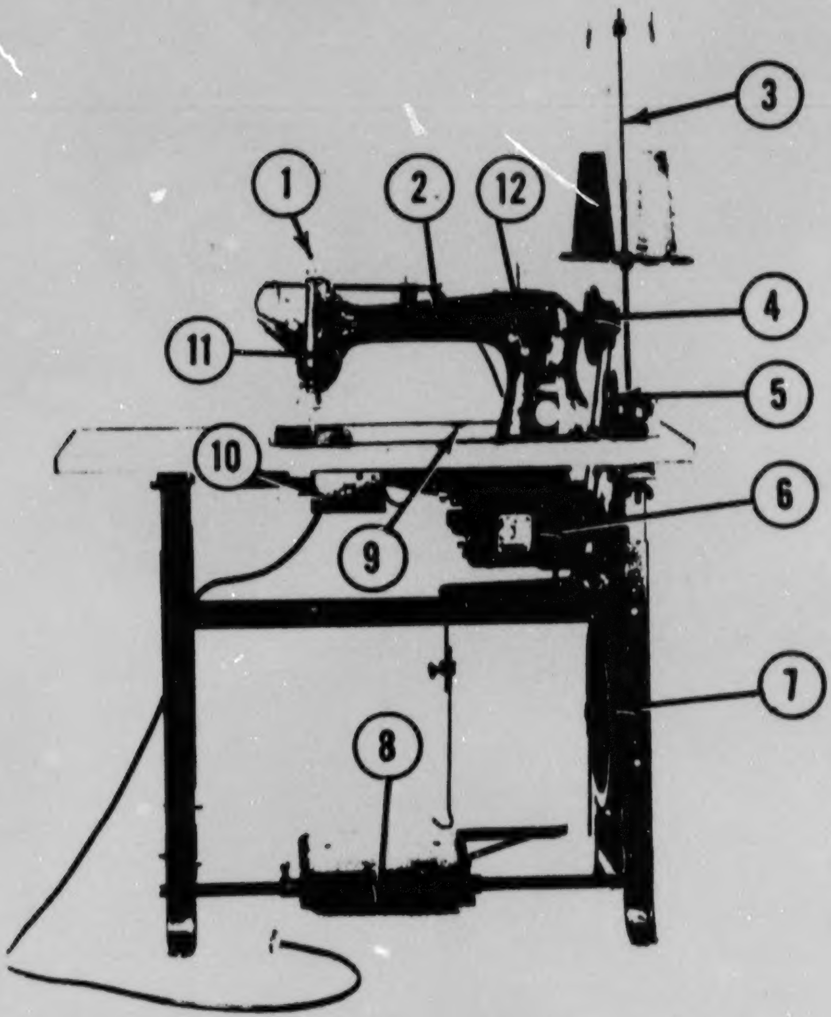


Figure 25 - Model 31-15 sewing machine.

1	Pressure regulating thumbscrew	7	Drive wheel
2	Arm	8	Treadle
3	Thread stand	9	Bed
4	Balance wheel	10	Switch
5	Bobbin winder	11	Tension regulating thumb nut
6	Motor	12	Feed regulator thumbscrew

B. Model 47W70 Darning Machine.

1. Description and operating features.

a. Model 47W70 has a tubular bed which is especially useful in darning sleeves, legs of trousers, and similar tubular articles of clothing not easily reached by a flat bed machine.

b. With its needle and rotary sewing hook, similar to that in the textile sewing machine model 111W155, it sews a lock stitch. It has no feeding mechanism, the operator moves the work back and forth under the needle. Because the presser foot rises with each up-stroke of the needle, the operator can move the work freely in any direction without operating the knee lifter.

c. The knee lifter is used to take tension off the thread when the operator is taking work out of the machine or changing the area of darning.

2. Tabulated data (Model 47W70)

a. The bed is 2½ inches in length.

b. The base is 1 5/8 inches high.

c. The maximum speed is 2,800 revolutions per minute.

3. Operator's Controls.

a. Motor Switch (Same as Model 31-15).

b. Motor Clutch Pedal (Same as Model 31-15).

c. Knee lifter. (Same as Model 31-15).

4. Needles, class and variety.

a. The needles for the model 47W70 darning machine are class 126, variety 3, sizes 10 through 24.

b. Definition of class, variety and size. (Same as for Model 31-15).

5. Thread twist and codes. (Same as for Model 31-15).

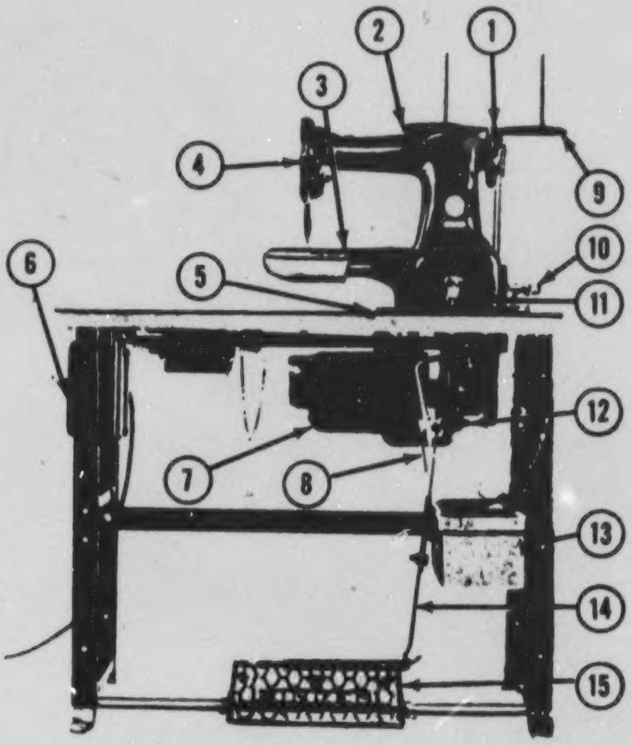


Figure 26 - **Model 47w70 darning machine.**

1 Balance wheel
2 Arm
3 Bed
4 Face
5 Bed base
6 Motor switchbox
7 Motor
8 Knee lifter rock shaft
9 Thread stand
10 Bobbin winder
11 Bed clamp
12 Clutch assembly
13 Tool drawer
14 Clutch pitman rod
15 Foot treadle

C. Model 246-5 overedging machine.

1. Description and operating features.

a. The model 346-5 overedger is used in the two-wheel textile repair trailer as well as in fixed installations. This machine has a differential feed, a trimmer, one needle, and two loopers.

b. The overedging machine is designed for simultaneous trimming and stitching of medium heavy and heavy textile goods with the type 504, or three-thread tight overedge stitch.

c. The stitch is formed by the sewing needle working in conjunction with the upper and lower loopers.

d. The trimmers work ahead of the needle and loopers, and will cut the cloth smoothly and at a sufficient distance from the point of penetration of the needle to permit the formation of a secure stitch.

2. Tabulated data. (Model 246.5)

a. Number of threads, three (3).

b. Speed (stitches per minute 5,000 maximum, 4,500 long runs).

c. Maximum thickness of material 1/4 inch.

3. Operator's Controls.

a. Motor Switch. (Same as Model 31-15).

b. Motor Clutch Pedal. (Same as Model 31-15).

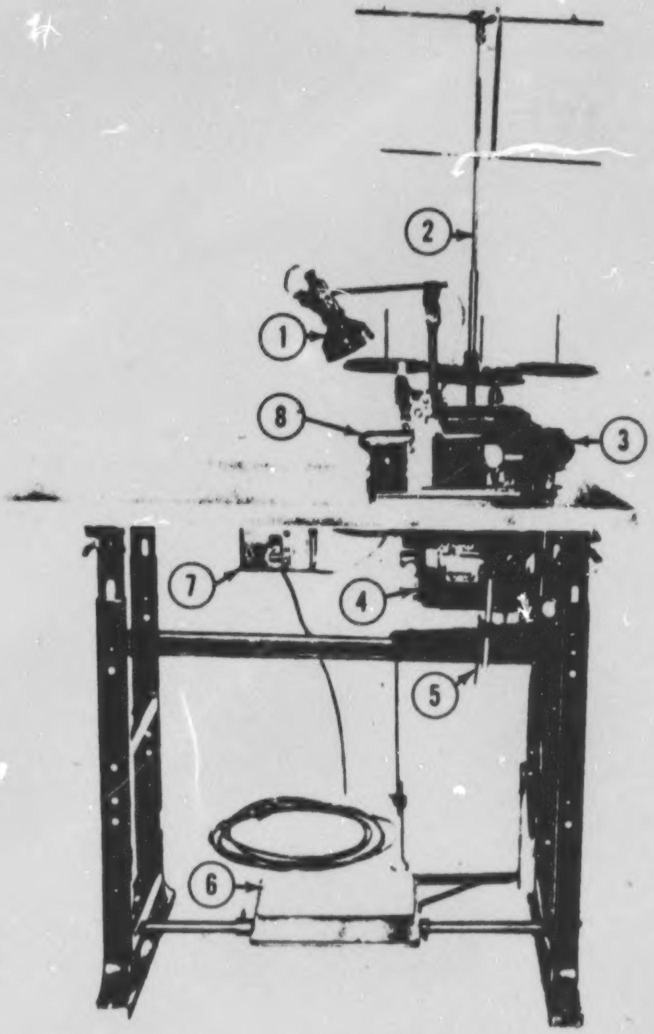
c. Knee lifter. (Same as Model 31-15).

4. Needles, class and variety.

a. The needles for the model 246-5 overedging machine are class 151, variety 1, standardization for military use has been made on sizes 16 and 18. This is a curved needle.

b. Definition of class and variety. (Same as for model 31-15).

5. Thread Twist and Codes. (Same as for model 31-15).



1 Electric light
2 Thread unwinder
3 Drive shaft pulley
4 Electric motor
5 Knee plate
6 Starting treadle
7 Toggle switch
8 Cloth plate

Figure 27 - Model 246-5 overedge sewing machine.

D. Model 175-60/61 button machine.

1. Description

a. Each model 175-60 and model 175-61 button machine, consists of a machine head, a motor, a stand and other component parts.

b. The head, the motor, and other component parts are mounted on the stand.

c. The head includes the machine base, the arm, face, and bed assemblies.

d. The bed is an iron casting which fits on the base, and supports the arm.

e. The bed casting contains the looper, the needle guide and thread finger.

f. Models 175-60/61 sew with a needle thread only; they therefore have no bobbins or bobbin winders. The chief difference between them is in the length of the needle bar stroke and the timing of the needle bar.

g. The motor for the button machine is different than the one used on the model 31-15 and 47W70. (See 31-15 motor). The button machine motor does not have a built-in clutch and brake assembly. The operating clutch for this machine is built into the machine bed.

2. Operating features.

a. With each operation of the right-hand or starting lever treadle the machine makes 16 single-thread chain stitches. If the starting lever treadle is held down, the machine automatically repeats this cycle of stitches. If the machine is set to sew 4-hole buttons, it makes, with one operation of the starting lever treadle 7 single-thread stitches in the back pair of holes, a crossover stitch to the front pair of holes, 7 stitches parallel to the first bar, and a knotting stitch. If the machine is set to sew 2 hole buttons, it makes 1 bar of 16 stitches with one operation of the starting pedal.

b. If the operator holds [illegible] foot on the starting treadle while the motor is running the machine continues to make its normal cycle of stitches. If the treadle is operated while the motor is stopped, the machine, when the motor is switched on, will automatically make its cycle of stitches.

3. Tabulated data.

a. Number of threads, one (1) (this machine does not use a bobbin thread.)

b. Type of stitch - chain. (Single thread)

c. Speed (1,000 RPM)

d. Type of buttons. (Two or four holes, flat)

4. Operators Controls.

a. Starting lever treadle (used to engage the running motor with the machine.) located on the right on the bottom of the stand.

b. Foot lifter treadle (used to raise the button clamp) located on the left side on the bottom of the stand.

c. Button clamp opener (used to insert or remove buttons in the jaws of the button clamp.)

5. Needles, class and variety.

a. The needles for model 175-60, the needles are of class 175, variety 7, sizes are 14, 16, and 20.

b. Definition of class and variety. (Same as for Model 31-15).

6. Thread twist and codes. (Same as for Model 31-15).

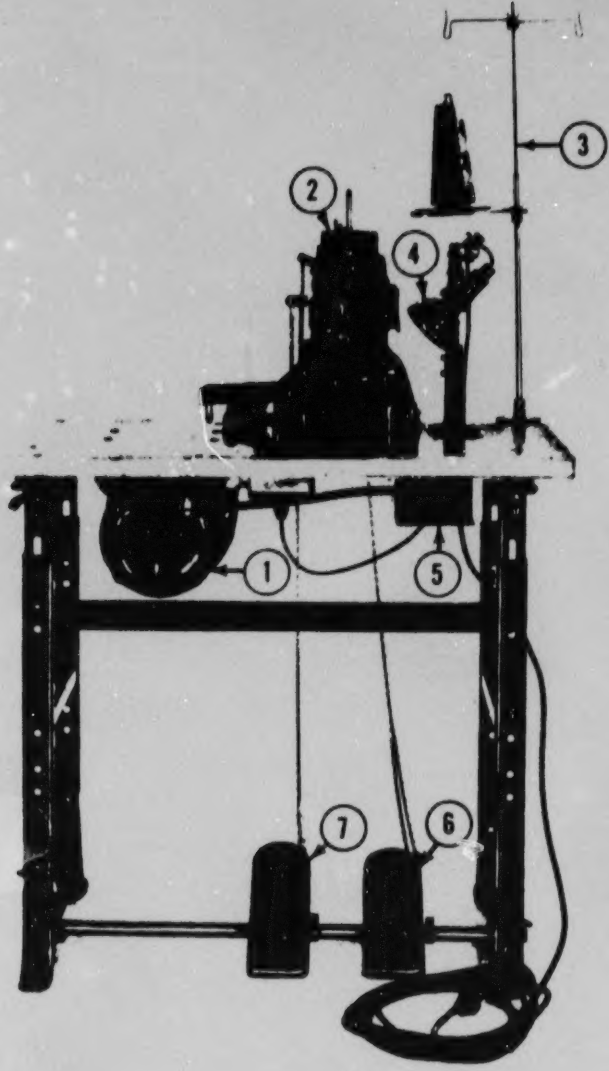


Figure 28 - Model 175-60 button sewing machine.

1 Motor
2 Face
3 Thread stand
4 Lamp
5 Switchbox
6 Starting lever treadle
7 Foot lifter treadle

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SECTION XIII

OPERATOR MAINTENANCE OF MODEL 31-15 SEWING MACHINE: MAINTENANCE FORMS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this hour the instructor will discuss operator's preventive maintenance services; safety precautions, and use of preventive maintenance form 2404 in performing operator's maintenance on model 31-15 sewing machine.

2. The important factor of this period will be to properly perform the category of preventive maintenance services which include: before, during and after operation services.

B. Objective

As a result of this instruction, the student, given appropriate references, lubrication chart, detailed lubrication instructions for the model 31-15 sewing machine, and appropriate tools and supplies, will be able to lubricate the 31-15 sewing machine with prescribed lubricant in accordance with appropriate service intervals and points of application specified on the lubrication charts; given an operator's check list, safety standards, and Equipment Inspection and Maintenance Worksheet (DA Form 2404) will be able to perform the before, during, and after preventive maintenance services in accordance with the operator's check list, and safety standards, making appropriate entries on DA Form 2404.

II. Presentation

A. Operator's Preventive Maintenance Services.

1. Principles of lubrication.

a. Before a sewing machine is lubricated, it is necessary to know the principles of lubrication.

b. The first method is known as the direct application. With this method the oil is applied through a hole in the part to feed the bearing surface. This method, because it is not long lasting, requires the machine to be oiled twice a day or every four (4) hours of operation.

c. The gravity feed method is where the oil is applied in a well. The oil flows from the well through a tube that is attached to the well at one end, and to the part that requires lubrication at the other end of the tube. As the part revolves, it uses the oil that flows through the tube. This should be checked twice a day or every 4 hours of operation.

d. The waste pack type of lubrication uses a reservoir packed with felt or cotton material that looks like waste (broken threads, shreaded material, etc). It is widely used on electrical motors. This "waste" is set directly under the armature shaft bushing to be lubricated. The armature shaft turning in the bushing will draw the oil up and into the bushing by means of friction. This method is used when a constant supply of lubricant is required, and to prevent oil from getting into the field winding or on the armature.

2. Types of lubricants required.

a. The lubricating oil (LO) used to lubricate the clothing and textile sewing machines is a highly refined mineral oil with a low pour point. It may be used in all temperatures, both above and below zero. This oil is free of paraffin which would cause the machine to "gum up" and collect grit and dust, which in turn would cause the parts to wear unnecessarily. "LO" means oil, light lubrication.

b. The lubricating oil (LO) is also used to lubricate the sewing machine motors, if the motor has an oil hole and not a grease fitting.

3. Lubrication charts.

a. Each machine has its particular lubrication chart.

b. The lubrication charts "point out" by pictures, the various locations of applying the lubricating oil and/or grease.

c. The charts tell what types of lubricant to apply to the various locations.

d. The charts will have the intervals of lubrication and application points.

4. Lubrication instruction.

a. The lubrication instruction in the particular technical manual pertaining to a specific sewing machine must be used in conjunction with the lubrication charts. These instructions, not only tells what to lubricate, and how much lubricant to apply, but they also tell how to lubricate, where to lubricate, what lubricant to use, how to clean specific parts, and what to clean the parts with.

b. Never deviate from these instructions, except as indicated in the instruction for usual and unusual operations.

c. Before applying any lubricant, remove all dirt, dust, grit, and lint that may be on the equipment being lubricated, also clean after application.

d. Never "over flood" the machine with oil, as this just as bad as not lubricating at all. The "overflooding" will accumulate dust and grit, which will cuase undue wear on parts.

B. Safety precautions.

1. While making adjustments, the operator must be careful to cut off the motor switch, or to remove the driving belt before he removes needles, bobbins, or performs other adjustments, which bring his fingers under the needle. Otherwise, he may accidentally start the machine, by stepping on the foot treadle pedal, and injure his hands or fingers.

2. While operating the machine, the operator must at all times be careful to keep his fingers away from the needle.

3. While making electrical connections, the alternating current generated by the trailer equipment for operation of the machine, is of sufficient amperage to be dangerous. Using personnel should be careful, especially while making connections between machine motors and the generator. The operator should take every precaution to prevent current from passing through his body to the ground, especially wet ground. The extension cords are well insulated, but the operator must keep his hands off bare terminals or wires, which are connected to the generator.

C. Use of preventive maintenance DA Form 2404 in performing operator's maintenance on model 31-15 sewing machine. (Equipment Maintenance and Inspection Worksheet).

1. A standardized form that you will record inspection, checkouts and maintenance services.

2. Requires all inspectors at all levels of maintenance to use the appropriate maintenance publication for the equipment and level of maintenance being inspected to take the guess work out of our maintenance system.

3. Preparation of form.

a. The instructor will demonstrate the current method of filling out DA Form 2404.

b. Student will follow instructor step-by-step in filling out DA Form 2404.

c. Assistant instructor will walk through class aiding students that need help.

d. Block 1 - enter the unit or organization designation (CMI personnel enter the organization to which the equipment is assigned).

e. Block 2 - enter the nomenclature and model designation of the equipment as it is recorded in the log book or equipment TM.

f. Block 3 - enter the requirement registration number, serial number, or federal stock number as applicable.

g. Block 4 - This does not pertain to textile repair.

h. Block 6 - enter the type of inspection or service to be performed (operator's daily, "Q" services, initial "TI", CMMI, etc.)

i. Block 7 - enter the current technical manual number with the latest changes, and TM date applicable to the equipment. Two blocks are provided when more than one TM is used.

4. Perform each check listed in the TM applicable to the inspection performed, following the sequence listed in pertinent TM, complete DA Form 2404 as follows:

a. Column a - enter TM item number.

b. Column b - for army aircraft, enter condition status; for other equipment enter "DL" if condition deadlines equipment.

c. Column c - enter deficiencies and shortcomings.

d. Column d - show corrective action for deficiency or shortcoming listed in column c.

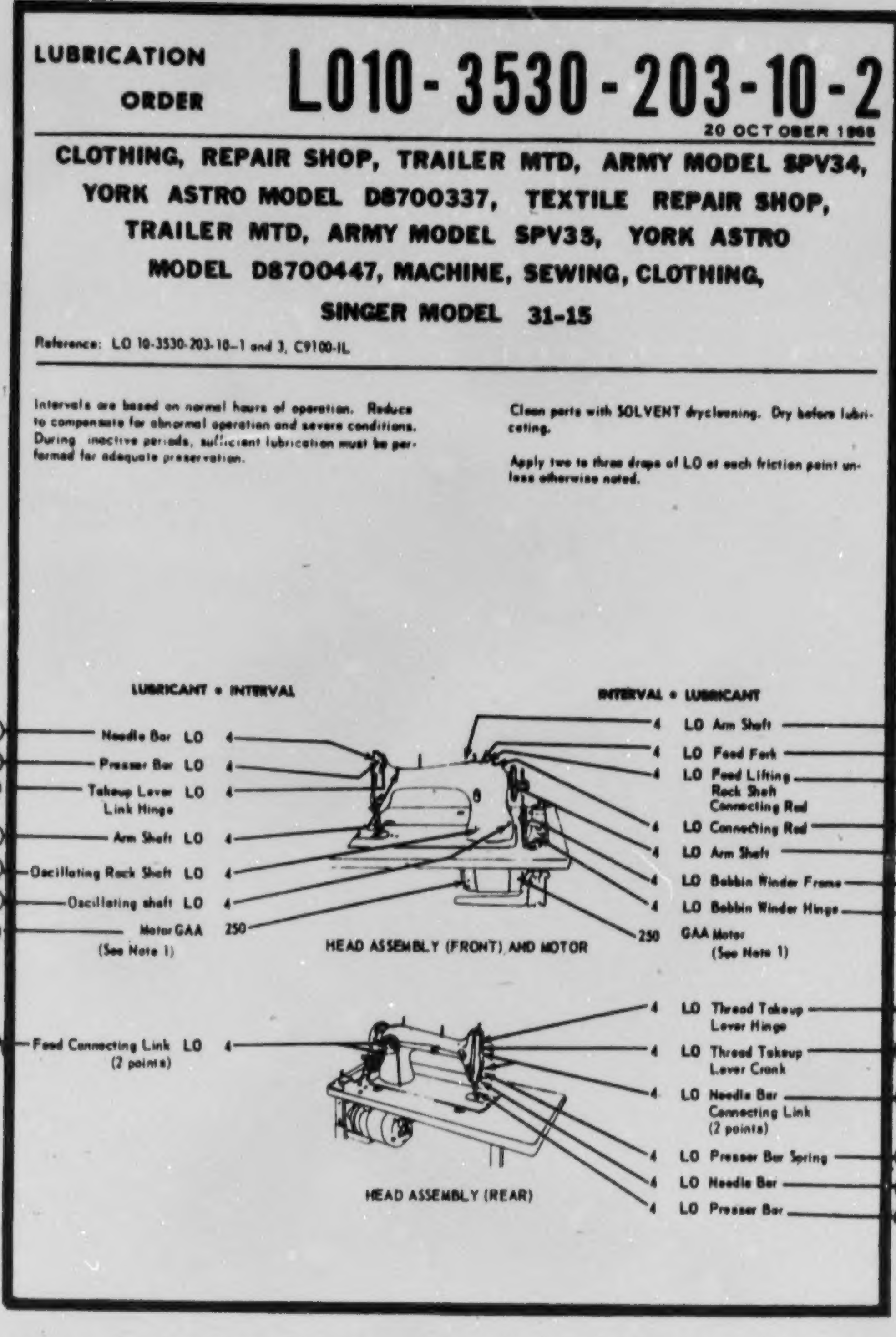
e. Column e - individual ascertaining completed corrective action will initial in this column.

f. For command material readiness inspection, enter scoring codes as follows: "D" for deficiency, "S" for shortcoming, "R" for material readiness rating, "O" for organizational maintenance rating, "F" for Field maintenance rating.

5. Technical manuals pertaining to textile equipment.

a. The TM 10-3530-203-10 contains information on the service upon receipt of the machine, operator's controls and adjustments, operation under usual condition, operation under unusual conditions, and guidance of the personnel of the using organization responsible for the first and second echelon maintenance.

b. TM 38-750 will be used in conjunction with TM 10-3530-203-10.



LUBRICATION ORDER **LO10-3530-203-10-2**

20 OCTOBER 1968

CLOTHING, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV34, YORK ASTRO MODEL D8700337, TEXTILE REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV35, YORK ASTRO MODEL D8700447, MACHINE, SEWING, CLOTHING, SINGER MODEL 31-15

Reference: LO 10-3530-203-10-1 and 3, C9100-IL

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean parts with SOLVENT drycleaning. Dry before lubricating.

Apply two to three drops of LO at each friction point unless otherwise noted.

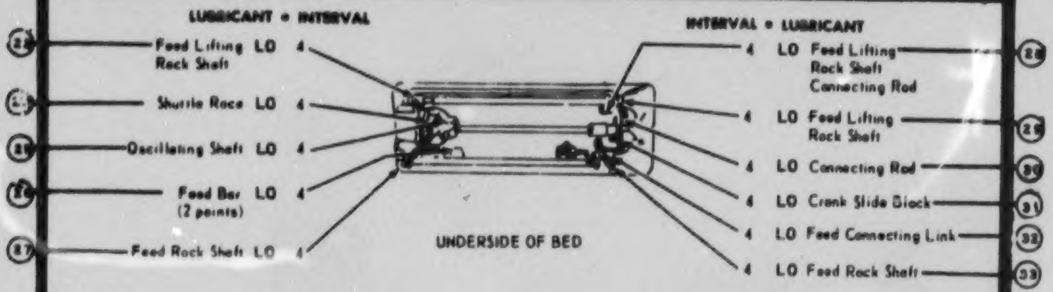
LUBRICANT • INTERVAL

① Needle Bar LO 4
② Presser Bar LO 4
③ Takeup Lever Link Hinge LO 4
④ Arm Shaft LO 4
⑫ Oscillating Rock Shaft LO 4
⑬ Oscillating shaft LO 4
⑭ Motor GAA 250 (See Note 1)
⑯ Feed Connecting Link LO 4 (2 points)

INTERVAL • LUBRICANT

4 LO Arm Shaft ⑤
4 LO Feed Fork ⑥
4 LO Feed Lifting Rock Shaft Connecting Rod ⑦
4 LO Connecting Rod ⑧
4 LO Arm Shaft ⑨
4 LO Bobbin Winder Frame ⑩
4 LO Bobbin Winder Hinge ⑪
250 GAA Motor (See Note 1)
4 LO Thread Takeup Lever Hinge ⑰
4 LO Thread Takeup Lever Crank ⑱
4 LO Needle Bar Connecting Link (2 points) ⑲
4 LO Presser Bar Spring ⑳
4 LO Needle Bar ㉑
4 LO Presser Bar ㉒

Figure 29 - *(1) Lubrication Order 10-3530-203-10-2 for clothing sewing machine.*


LUBRICANT • INTERVAL
22
Feed Lifting Rock Shaft LO 4
Shuttle Race LO 4
25
Oscillating Shaft LO 4
26
Feed Bar LO 4
(2 points)
27
Feed Rock Shaft LO 4
UNDERSIDE OF BED
INTERVAL • LUBRICANT
4 LO Feed Lifting Rock Shaft Connecting Rod
28
4 LO Feed Lifting Rock Shaft
29
4 LO Connecting Rod
30
4 LO Crank Slide Block
31
4 LO Feed Connecting Link
32
4 LO Feed Rock Shaft
33

LUBRICANTS	EXPECTED TEMPERATURES	INTERVALS
LO- Lubricating Oil, General Purpose	all temperatures	Intervals given are hours of normal operation.
GAA- Grease, Automotive and Artillery	all temperatures	

NOTES:

1. MOTOR. Lubricate oil points with two or three drops of LO every 4 hours. Fill grease cups as necessary with GAA grease. Turn grease cup clockwise three turns every 250 hours.

A copy of the Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

Figure 30 - (s) — Continued.

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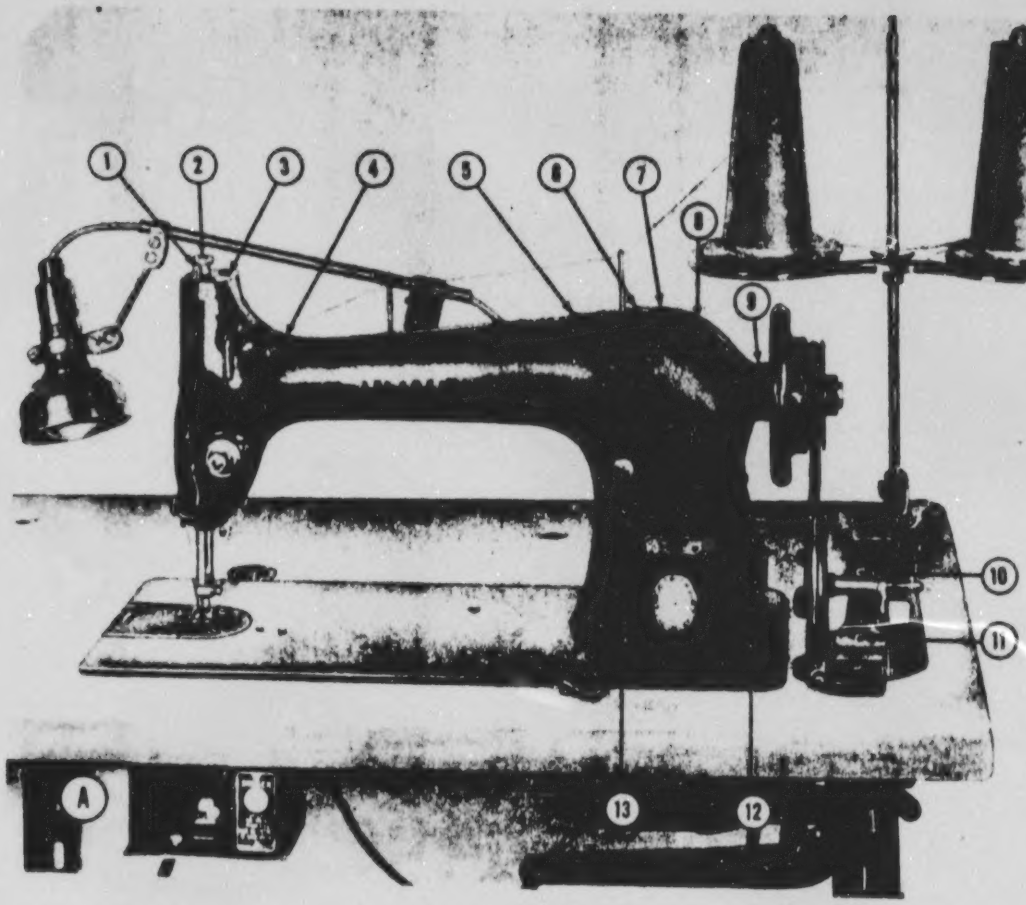

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7
8
9
10
11
12
13
A

Figure 31 *(1). Lubrication points on clothing sewing machine.*

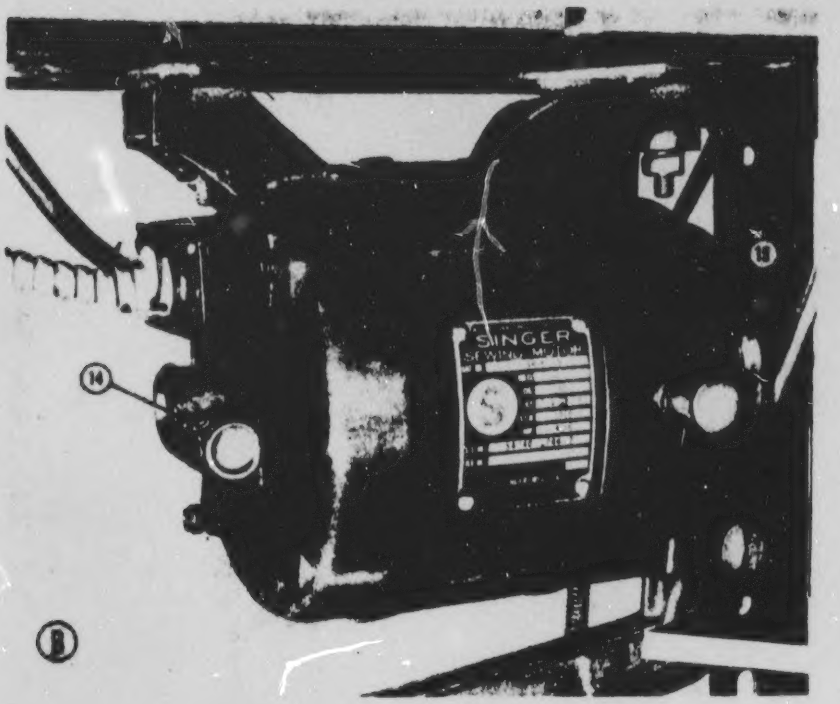
SINGER
SEWING MOTOR
14
18
B

Figure 32 *(2)* — Continued.

Figure 33 - (3) — Continued.

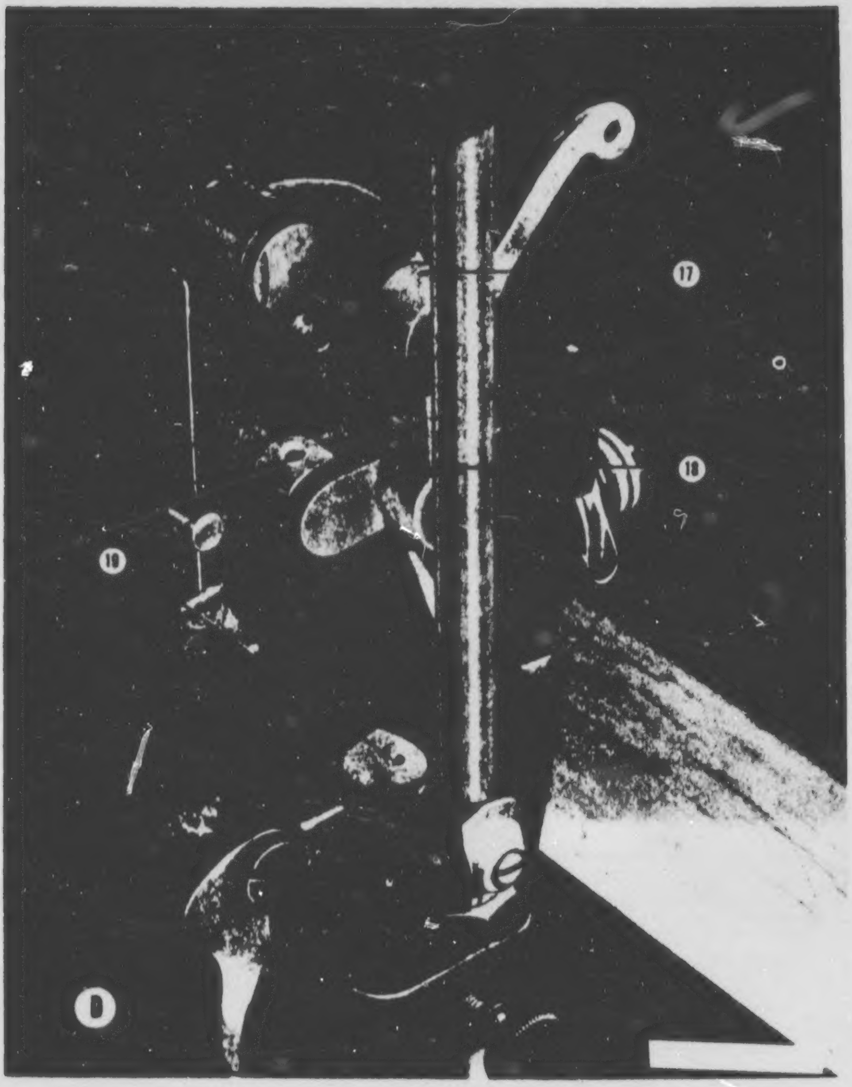

Figure 34 - *(4)* — Continued.

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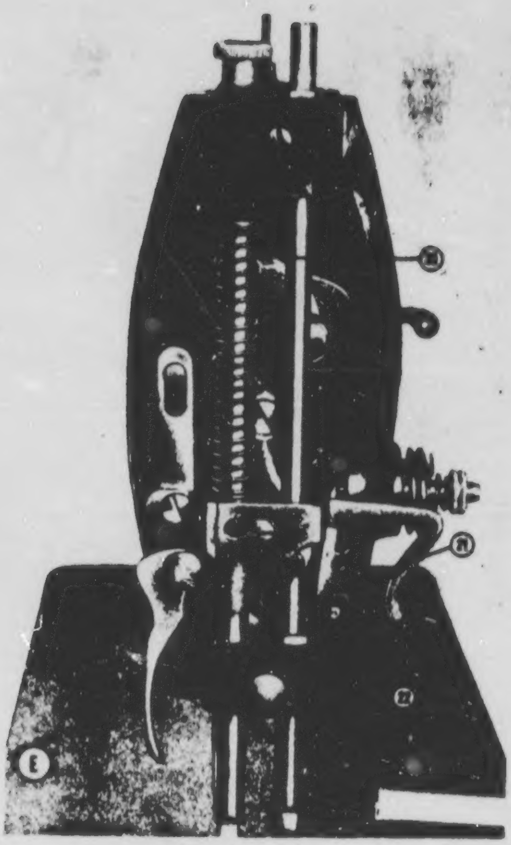

Figure 35 - (5) — Continued.

633

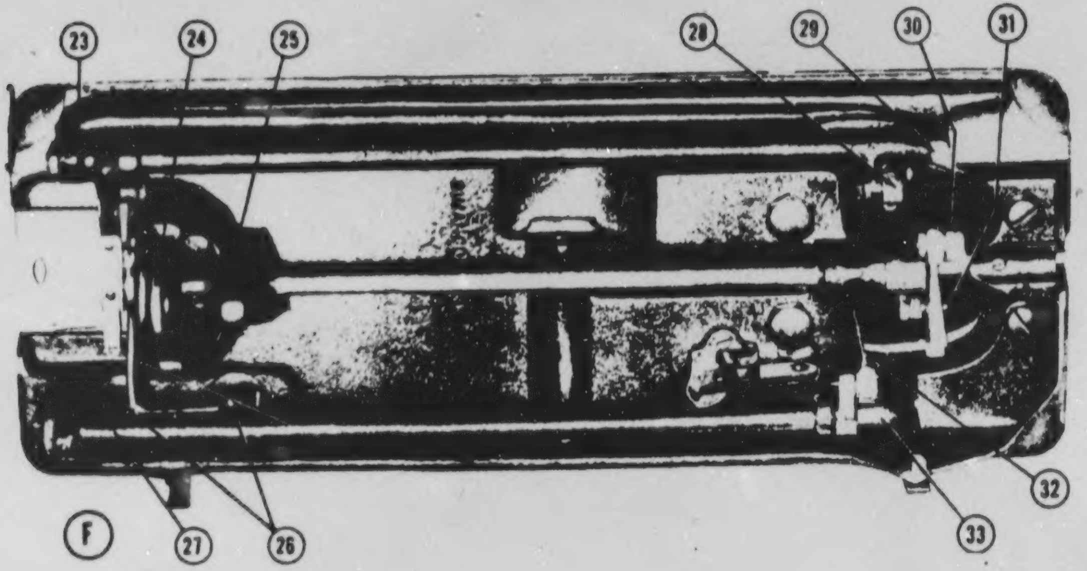
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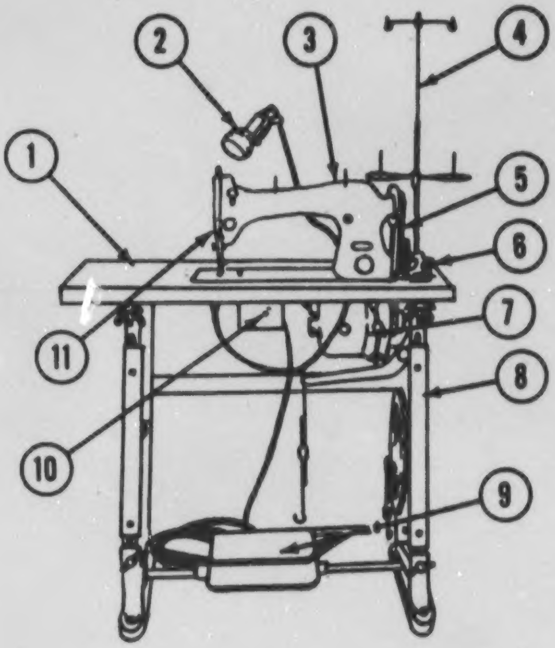
Figure 36 - *(6)* — Continued.

Figure 38

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 10-3530-203-10 MACHINE, SEWING, CLOTHING



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.	

ITEM		PAR REF
2	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
3	CLOTHING MACHINE HEAD. Inspect the clothing machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting. Make certain the needle is installed with the long groove to the operator's left.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for a 1-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components, and loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	

ITEM		PAR REF
8	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
9	STARTING TREADLE. Inspect the treadle for bent, broken, or loose components, and loose mounting. Operate the treadle to see that the pulley brake lever engages the motor drive pulley with the drive motor when the treadle is depressed. Make certain the pulley brake lever disengages the drive pulley from the motor and stops the pulley when the treadle is released (during operation).	
10	MOTOR SWITCH. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off.	
11	PRESSER BAR LIFTER. Inspect for bent or broken presser bar lifter. Inspect the lifter for loose mounting. Make certain the lifter raises, locks, unlocks, and lowers the presser foot.	
	NOTE 1. OPERATION. During operation observe for any unusual noise or excessive vibration.	

OPERATOR MAINTENANCE OF MODEL 31-15 SEWING MACHINE

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the student will be able to lubricate the model 31-15 sewing machine with prescribed lubricant in accordance with appropriate service intervals and points of application specified on the lubrication charts. It is important that the student observe the safety precautions in performing the preventive maintenance services. The student will also make the appropriate entries on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

II. Study References

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Trailer Mounted, Clothing Repair Shop, Trailer Mounted, Chapter 3, Section II, par 53-56, pg 69-77.

III. Supplies, Tools, and Equipment Required

31-15 Sewing Machine

Oil Can (1 per student)

Cleaning cloth

DA Form 2404 (Equipment Inspection and Maintenance Worksheet)

IV. Directions to the student

A. Follow the step procedures as outlined by the instructor.

B. If you have a question in your mind regarding this practical exercise, do not hesitate to call upon your instructor.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance and inspecting the final results for evaluation purposes.

VI. Job Breakdown

A. The performance standards that will be used in checking the students work upon completion of the practical exercise are as follows:

1. Machine and all components to be lubricated, cleaned and free of dust or dirt.
2. All lubrication points lubricated and free of excess oil or lubricants.
3. Safety precautions will be enforced for your protection.

B. The procedures for lubrication and preventive maintenance services are located on the proceeding lubrication charts and photographs and also the preventive maintenance chart.

SECTION XIV

PREPARATION FOR OPERATION, MODEL 31-15 SEWING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period of instruction the instructor will discuss the procedures followed in preparing the Model 31-15 sewing machine for operation.

2. This instruction will include: threading the machine, threading the bobbin winder, winding the bobbin, threading the bobbin case and inserting the bobbin case into the shuttle race assembly.

B. Objective

As a result of this instruction, the student, given appropriate references, unthreaded Model 31-15 Sewing Machine, one empty bobbin, threading charts, appropriate needles, tools, and supplies, will be able to prepare Model 31-15 Sewing Machine for operation by removing the bobbin case from the shuttle, threading the bobbin winder according to thread chart, winding a bobbin, threading the bobbin case by correctly placing bobbin in case, installing bobbin case in shuttle race with finger of case pointing upward, installing needle in needle bar with groove of needle to operator's left, and threading the machine according to threading chart.

II. Presentation

A. Removing the bobbin case.

1. Turn the balance wheel toward you until the needle moves up to its highest point.

2. Draw out the slide (view plate) in the bed of the machine.

3. Reach under the stand top with the thumb and forefinger of the left hand, open the latch on the bobbin case and, holding the bobbin case by the latch, lift it to the left and out of the shuttle race.

4. As long as you hold the latch open, the bobbin will not fall out of the bobbin case.

B. Threading the bobbin winder (winding a bobbin).

1. To wind thread on the bobbin, make sure you place the bobbin on the bobbin winder spindle and push it on as far as it will go. Make sure you thread it correctly to keep the thread even and smooth on the bobbin.

2. The bobbin may be wound while the machine is stitching. However, if no fabric is under the needle, see that the needle thread is pulled out of the eye of the needle, and lock the presser foot in the raised position by raising the hand lifting lever. The needle thread should be pulled from the needle to prevent its balling up in the shuttle race assembly.

3. To change the amount of thread wound on the bobbin before the automatic release operates, use the bobbin winder stop latch screw.
To wind more thread on the bobbin, turn the screw to the right. To wind less thread, turn the screw to the left.

4. If the thread fails to wind evenly on the bobbin, or piles up on one side of the bobbin, loosen the screw that holds the tension bracket, and move the bracket to the right or left as required, then tighten the screw.

C. Threading the bobbin case. (inserting the bobbin in the bobbin case)

1. When the bobbin is put into the bobbin case, the thread should draw over the top of the bobbin and from left to right, just before the bobbin

is slipped into the case. (The bobbin should rotate clockwise as you pull the thread.)

2. To thread the bobbin case, hold it in the left hand, have the slot in the edge at the top, and place the bobbin in the case so that the thread pulls over the top of the bobbin and away from you.

3. Pull the thread into the bobbin case thread slot, drawing the thread down under the bobbin case tension spring and into the delivery eye at the end of the tension spring.

D. Installing the bobbin case.

1. See that the needle is raised above the throat plate.

2. With eht thumb and forefinger of the left hand, hold the threaded bobbin case by the latch. When the latch is held out, the bobbin will not fall out of the case.

3. Reach under the stand top and place the bobbin case on the center stud of the shuttle body so that the position finger on the bobbin case is opposite the notch at the top of the position plate.

4. Release the latch and press the bobbin case into the shuttle race until the latch snaps into the groove near the end of the stud of the shuttle body. (The position finger should be in the notch at the top of the shuttle race and about 3 inches of thread should be left hanging down from the bobbin case.) Hold the needle thread slack, turn the balance wheel toward you and as the take-up lever reaches the top, after the needle has gone down and is on its up stroke, pull gently on the needle thread. The bobbin thread should come up with the needle thread. Place these two threads to the rear of the machine.

E. Installing and setting the needle.

1. Select a good needle of proper class, variety and size, never use a blunt or bent needle.

2. To set the needle, turn the balance wheel toward you until the needle bar moves up to its highest point.

3. Have the long groove of the needle to the operator's left.

F. Threading the Model 31-15 Sewing Machine.

1. The needle thread is usually taken from the cone on the left side of the thread stand.

2. If the size or type of thread is being changed often, as in repair work, the operator may use a small spool of thread held on the right hand spool pin.

3. Always use left twist thread for both the needle and bobbin.

4. The left hand spool pin is used as a thread guide.

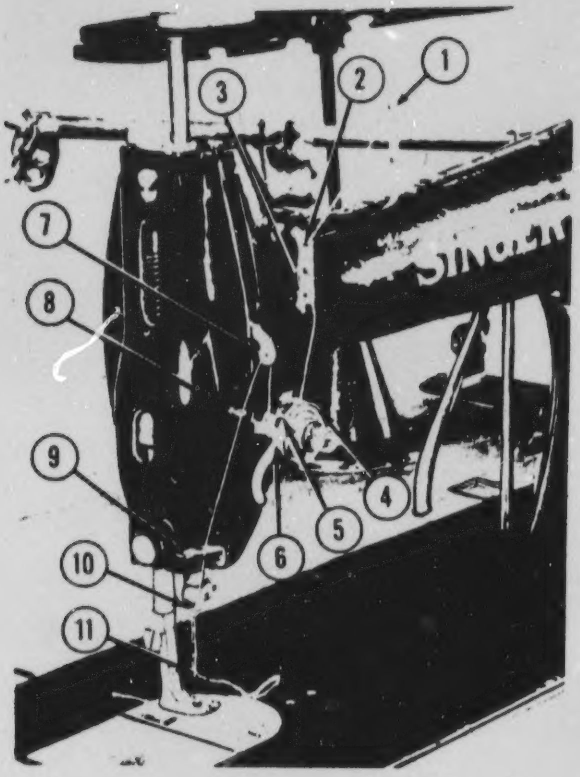


Figure 39- Threading points.

1 Top hole in left-hand spool pin
2 Top hole in thread retainer
3 Bottom hole in thread retainer
4 Tension disks
5 Hook of thread takeup spring
6 Slack thread regulator
7 Hole in thread takeup lever
8 Top eyelet on face plate
9 Bottom eyelet on face plate
10 Eyelet in needle bar thread guard
11 Eye of needle

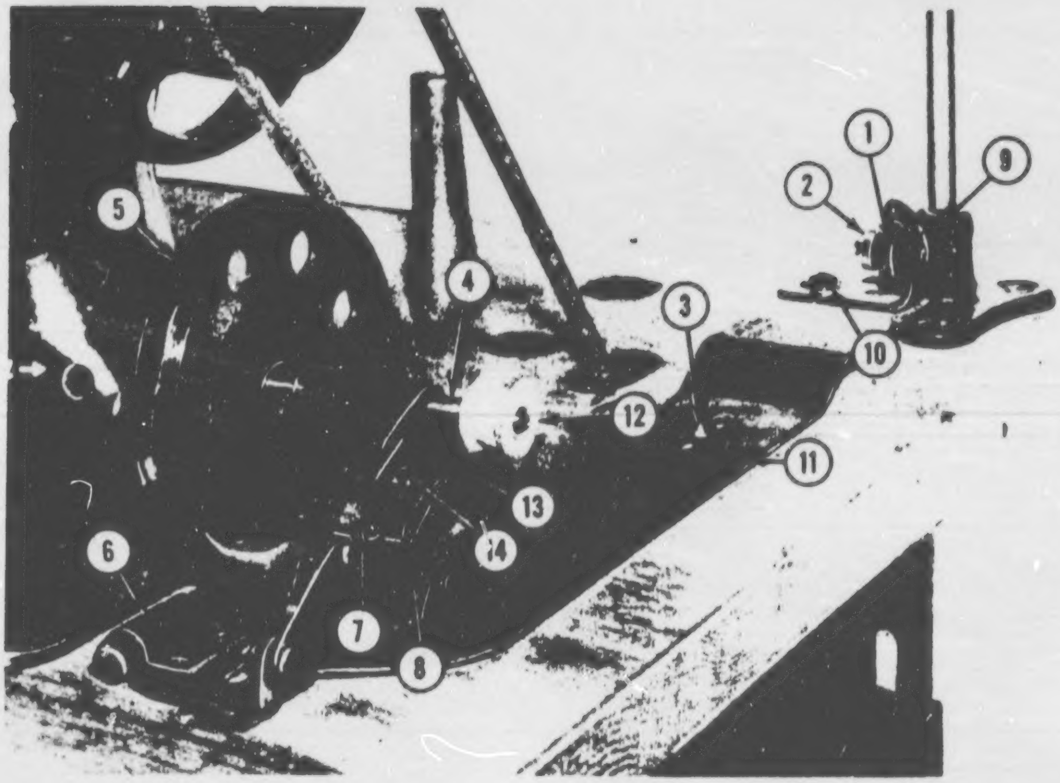


Figure 40 - Bobbin winder.

1 Tension disks
2 Thumb nut
3 Wood screw
4 Spindle
5 Pulley
6 Brake
7 Stop latch thumb lever
8 **Frame**
9 Tension bracket
10 Tension bracket screw
11 Tension bracket base
12 Shuttle bobbin
13 Stop latch
14 Stop latch screw

PREPARATION FOR OPERATION MODEL 31-15 SEWING MACHINE

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the student will be able to thread the machine, threading the bobbin winder, winding the bobbin, threading the bobbin case, and inserting the bobbin case into the shuttle race assembly.

II. Study References

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Trailer Mounted, Clothing Repair Shop, Trailer Mounted. Section III, pages 30-33, par 23-25.

III. Supplies, Tools and Equipment Required

31-15 Sewing Machine

Thread (2 cones per Student)

Bobbins - (2 per student)

IV. Directions to Students

A. Follow the step procedures as outlined in Para VI A.

B. To ask questions when in doubt during the practical exercise.

V. Performance Standards

Instructor will use the performance standards as set forth in par VI B in checking the students performance and inspecting the final results.

VI. Job Breakdown

A. The performance steps to be used by the student in preparing the model 31-15 for operation are as follows:

Threading the Sewing Machine Model 31-15

1. Thread the stand.	1. Bring the thread from the cone up and over the unwinder, from the back over to the front.

2.	Spool Pin.	2.	Pass the thread through the top hole of the spool pin on your right (from right to left).
3.	Spool Pin.	3.	Pass the thread through the top hole.
4.	Thread Retainer.	4.	Pass the thread through the top hole from right to left middle hole, left to right and bottom hole right to left.
5.	Slack thread regulator.	5.	Pass the thread down between the tension disks with the thread running from right to left under the tension controller stud. Bring the thread around the tension controller over the slack thread, take-up spring and down to the slack thread regulator.
6.	Slack thread regulator.	6.	Pass the thread under the regulator and up to the thread take-up lever.
7.	Thread take-up lever.	7.	a. Pass the thread through the hole in the thread, take-up lever from right to left.
8.	Thread top guide on the plate.	8.	Snap the thread through this guide. The side away from you is open.
9.	Thread bottom guide on face plates.		
10.	Thread needle guide.	10.	a. Hold the end of thread in your right hand and with your left bring the thread up into horizontal position.
			b. Snap the thread through the needle bar thread guide.
			c. The right side of this guide is open.
11.	Needle	11.	a. Pass the thread through the eye of the needle from left to right.
			b. Leave about six inches of thread through the needle.

Rewinding the bobbin

1. Place empty bobbin onto bobbin winder spindle.	1. Be sure bobbin is pushed against shoulder on spindle.
2. Pull thread from cone, up and over the thread unwinder on the thread stand.	2. Thread must be pulled from the back side of the thread on winder toward the operator.
3. Push thread through hole in bobbin winder tension bracket.	3. Tension bracket must be threaded from right to left.
4. Pull the thread between the two bobbin winder tension disks.	4. Thread must be pulled around back side of the disk toward the operator.
5. Wind end of thread around empty bobbin six or eight times.	5. Pull thread under bottom side of empty bobbin and wind thread clockwise.
6. Push bobbin winder stop latch thumb lever forward.	6. Make sure bobbin is on bobbin winder spindle far enough so that the bobbin winder stop, latch will fit up into bobbin.
7. Start machine to fill bobbin.	7. a. Push down on the top of the treadle to start the machine. b. When bobbin is full bobbin winder will stop automatically.
8. Remove full bobbin from bobbin winder spindle.	8. Break thread off close to the bobbin winder tension disk.

Basic Operation.

1. Check threading.	1. Make sure the machine is threaded properly.
2. Check needle.	2. The long groove of the needle must be to the left.
3. Raise hand lifting lever.	3. The hand lifting lever can be raised or lowered either by hand or knee.
4. Place the two threads to the back of the machine.	4. The needle thread goes between the toes of the presser foot and then to back of the machine.

5. Raise needle bar to its highest position.	5. The needle must be up.
6. Place material under the presser foot.	6. Be sure you align the material up so that the needle will penetrate it in the desired location.
7. Lower presser foot.	7. Lower presser foot either by hand or knee.
8. Set needle into material.	8. a. Turn the balance wheel by hand to set the needle. b. Turn balance wheel toward operator.
9. Turn motor switch on.	9. Be sure you have foot off the treadle when you turn the switch.
10. Step down on the top of the treadle.	10. This starts the machine, sew about one inch.
11. Raise the presser foot slightly with knee.	11. With presser foot up sew back to the beginning.
12. Lower the presser foot.	12. a. Sew down the desired length, the double stitching at the beginning is called a tack. b. Every seam should be started and ended with a tack.
13. Turn balance wheel by hand.	13. Until the needle has reached its highest position and starts down. As the needle bar just starts down stop turning the wheel.
14. Raise the hand lifting lever.	14. Have it in its highest position.
15. Remove the material.	15. Pull the material to the back.
16. Turn the motor switch off.	16. a. Always turn off the motor switch when you finish with the machine.

b. After you turn the motor switch off grip the balance wheel tight in your right hand and step down on the toe of the treadle to stop the motor from drifting.

Removing the bobbin case.

1. Place needle bar in high point.	1. Turn balance wheel to operator.
2. Lift machine head back in rest pin.	2. Make sure sewing lamp does not strike table top.
3. Open the latch on bobbin case.	3. With the thumb and forefinger of the left hand.
4. Remove the bobbin case.	4. a. Make sure to hold latch open. b. Lift it to the operators left.

Threading the bobbin case.

1. Hold bobbin case with the slot in the edge being near the top.	1. Hold case in left hand.
2. Place bobbin in case.	2. The thread must pull over the top of the bobbin and away from you.
3. Place thread under bobbin tension spring and into the delivery eye.	3. Pull thread into the slot.

Replacing the bobbin case.

1. Place needle bar in the highest point.	1. Turn balance wheel toward operator.
2. Tilt machine head back and let it rest on the rest pin.	2. Make sure the sewing lamp does not strike the table top.
3. Place the bobbin case on the center stud of the shuttle body.	3. Hold the latch open with finger on thumb of left hand.
4. Place the position finger on the bobbin case into the slot of the position plate.	4. Position plate keeps the bobbin case from turning.

5. Place machine head in upright position.	5. Do not let machine head drop.

Removing and installing the needle.

1. Place needle bar in highest point.	1. Turn balance wheel toward operator.
2. Remove the needle.	2. a. Loosen the needle clamp screw. b. Make sure that the needle does not drop down into the shuttle race assembly.
3. Replace needle into needle bar.	3. a. The class and variety of the needle for this machine is 16 x 87. b. Use the proper needle size for thread and material being used. c. Make sure that the needle is up and in the needle clamp as far as it will go. d. Make sure that the long groove of the needle is to the left. e. Make sure that the needle clamp screw is tight.

B. PERFORMANCE CHECKING STANDARDS

1. In the threading of this machine, the three holes and all thread guides must be used.
2. The bobbin must turn clockwise.
3. The long groove of the needle must go to the operator's left.

SECTION XV

ADJUSTMENT AND OPERATION OF MODEL 31-15 SEWING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this four (4) hours of instruction, the instructor will discuss all of the necessary adjustments that a sewing machine operator must know so that he can effectively operate his machine, and to keep his sewing machine in a good operating condition.

2. The instructor will demonstrate each phase of operator's adjustment during this period, at this time he will emphasize the purpose of each adjustment.

B. Objective

As a result of this instruction, the student given model 31-15 sewing machine (previously prepared for operation), appropriate tools, supplies, references, deviation standards, and timing and adjustment measurements, will be able to adjust the motor clutch pedal to achieve the correct starting and braking action of the machine, adjust knee lifter to achieve a position that will be comfortable to operate the machine, and time the needle bar with the shuttle point according to timing measurements; given operation instructions on inserting and removing work, safety precautions, thread tension, charts, and material of various thicknesses, the student will be able to sew, make adjustments to the presserfoot pressure, and stitch lengths according to the thicknesses of material, adjust the bobbin and needle threads according to tension charts, wind the bobbin while sewing, adjust bobbin winder and bobbin winder tension, observe all safety precautions, perform "during operation" preventive maintenance services in accordance with lubrication charts and operator's PM check list, remove work from machine as stated in TM 3530-203-10, and perform "after operator's" preventive maintenance services according to operator's PM check list and TM 3530-203-10.

II. Presentation

A. Timing the needle with a shuttle point of the model 31-15 sewing machine.

1. The needle must be of the correct class and variety, and should be in good condition.

2. Remove the throat plate from the bed of the machine.

3. Remove the feed dog.

4. Turn the balance wheel until the shuttle body is in the correct position for timing.

5. Remove the face plate from the machine.

6. Raise or lower the needle bar so that the eye of the needle is 1/16 of an inch below the point of the shuttle body.

7. Replace the feed dog.

8. Replace throat plate and throat plate screws.

9. Replace the face plate.

B. Inserting Work

1. Turn the balance wheel to bring the needle bar up.

2. Raise the hand lifting lever in the up position.

3. Place the needle and bobbin threads towards the back of the machine.

4. Place the material under the presser foot.

5. Set the needle at the starting point of the material.

6. Lower the presser foot.

7. Turn the motor switch on.

C. Removing work.

1. Turn the balance wheel to raise the needle bar to its highest point.

2. Raise the hand lifting lever to the up position.

3. Remove the material from the machine.

4. Turn the motor switch off.

D. Adjusting motor clutch pedal.

1. Loosen the pitman rod clamp.

2. Lower or raise the top portion of the foot threadle to the proper position.

3. Tighten the pitman rod clamp.

E. Adjusting the knee lifter.

1. Adjust the position of the knee plate.

   a. Loosen the rack shaft knee hub setscrew.

   b. Set the knee plate at desired position.

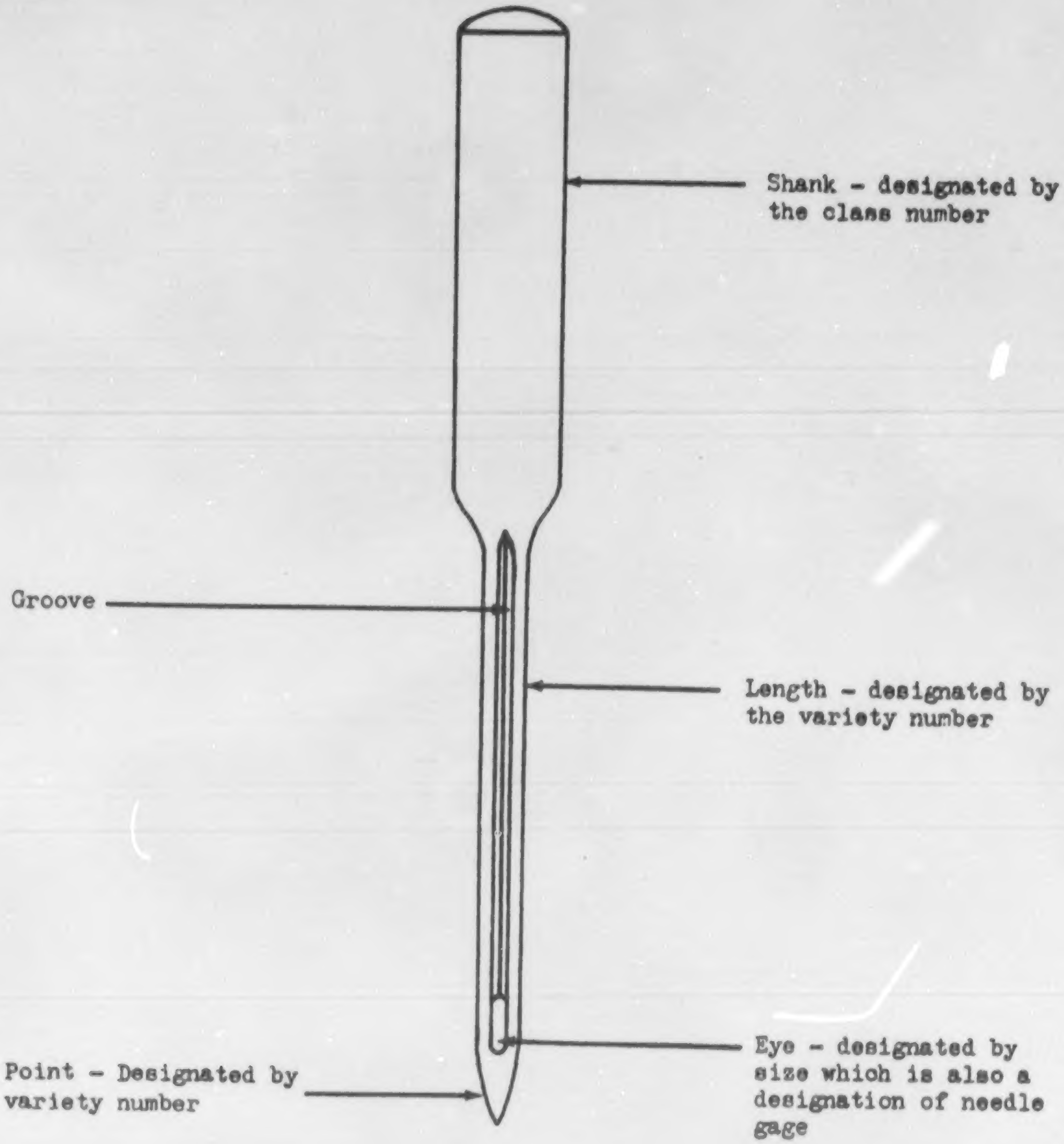
   c. Tighten the rack shaft knee hub set screw.

2. Adjusting the rack shaft lifting bracket.

   a. Loosen the rack shaft lifting bracket set screw.

   b. Turn the lifting bracket to the desired position.

   c. Tighten the rack shaft lifting bracket setscrew.


Shank - designated by the class number
Groove
Length - designated by the variety number
Eye - designated by size which is also a designation of needle gage
Point - Designated by variety number

NEEDLE 16 x 87

Figure 41

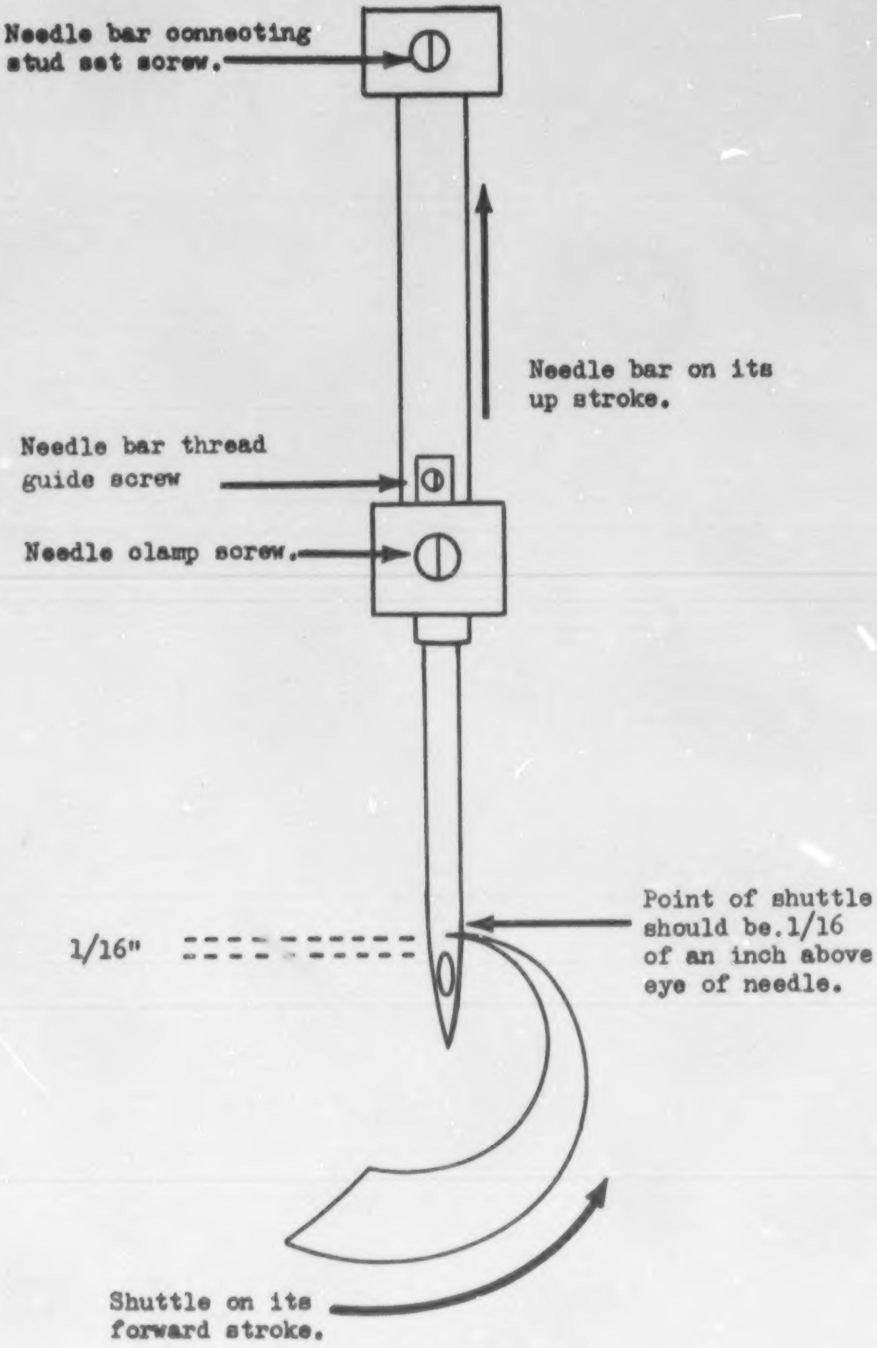

Needle bar connecting stud set screw.
Needle bar on its up stroke.
Needle bar thread guide screw
Needle clamp screw.
1/16"
Point of shuttle should be 1/16 of an inch above eye of needle.
Shuttle on its forward stroke.

Figure 42

TIMING NEEDLE WITH SHUTTLE

ADJUSTMENT AND OPERATION OF MODEL 31-15 SEWING MACHINE

PRACTICAL EXERCISE

I. Introduction

During this period of instruction the instructor will discuss the adjustment and operation procedures of the model 31-15 sewing machine.

II. Study References

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Trailer Mounted, Clothing Repair Shop, Trailer Mounted. Section III, page 30-33, par 23-25.

III. Supplies, Tools, and Equipment Required

31-15 Sewing Machine

Thread (2 cones per student)

Bobbins (2 per student)

Screwdriver (1 per student)

IV. Directions to Students

A. Students will follow the step procedures as outlined in par VI, A.

B. Student will ask questions during the practical exercise, when in doubt.

V. Performance Standards

Instructor will use the performance standards as set forth in Par VI, B in checking the students performance and final results.

VI. Job Breakdown

A. The performance [illegible] to be used by the student in adjustment and operation of model 31-15 sewing machine are as follows:

Timing needle with shuttle point.

1. Check needle for correct class, variety and condition.	1.	a. This machine uses a class 16, variety 87 needle. They come in sizes 14 through 25.
		b. The long groove of the needle goes to the left.
		c. Be sure that it is up in the needle clamp as far as it will go.
		d. Make sure that the needle clamp screw is tight.
2. Remove throat plate.	2.	Turn throat plate screws to the left to remove.
3. Remove feed dog.	3.	a. Remove the two (2) screws.
		b. Use proper size screwdriver, so you do not damage the head of the screws.
4. Turn balance wheel until shuttle body is in correct position for timing.	4.	a. Turn balance wheel towards the operator.
		b. Turn balance wheel until the point of the shuttle moves to the back of the machine, then forward to the center of the needle.
5. Remove face plate.	5.	Just loosen the face plate screws, do not remove them.
6. Raise or lower needle bar.	6.	Raise or lower so that the eye of the needle is 1/16 of an inch below the point of the shuttle body.
7. Replace feed dog.	7.	a. Don't burr the heads of the screws.
		b. Do not overtighten.
8. Replace throat plate and throat plate screws.	8.	Turn screws to the right to replace them.

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Inserting work.

1. Turn balance wheel, to bring needle bar up.	1. a. Turn balance wheel toward the operator. b. Stop turning balance wheel when the needle is in its highest position.
2. Raise hand lifting lever.	2. The hand lifting lever can be raised or lowered either by hand or knee.
3. Put the needle and bobbin threads to the back of the machine.	3. The needle thread goes between the toes of the presser foot, and then to the back of the machine.
4. Place material under the presser foot.	4. Be sure to position the material so the needle will penetrate at the desired spot.
5. Set the needle into the material.	5. Be sure to turn the balance wheel toward you.
6. Lower the presser foot.	6. Lower the presser foot either by hand or foot.
7. Turn motor switch on.	7. Be sure to have your foot off of the front part of the treadle when you turn the switch on, and your hands away from the needle.

Removing work.

1. Turn balance wheel to raise needle bar to its highest position.	1. Make sure to turn the balance wheel toward the operator.
2. Raise the hand lifting lever.	2. a. Have it in its highest position. b. This releases the tension on the needle thread.
3. Remove the material.	3. a. Pull the material to the back of the machine. b. Cut the thread about six (6) inches from the needle.

	c. Make sure that you cut the bobbin thread.
	d. Keep same length of bobbin and needle thread.
4. Turn the motor switch	4. a. Always turn off the motor switch when you finish sewing.
	b. After the switch is turned off, grip the balance wheel tightly and step down on the top of the treadle to stop the motor from drifting.

Adjusting motor clutch pedal.

1. Loosen pitman rod clamp.	1. Hold the pitman rod so it will not slip.
2. Lower or raise the top part of the treadle.	2. Have the bottom part of the treadle about one inch from the floor.
3. Tighten the pitman rod clamp.	3. Do not overtighten the clamp as it is easily broken.

Adjusting the knee lifter.

1. Adjusting the position of the knee plate.	1. a. Item No. 7 fig 48 TM 10-263.
a. Loosen the rack shaft knee hub setscrew.	b. The knee plate must be held in place until the set screw has been tightened.
b. Set knee plate at desired position.	c. Caution, do not overtighten this screw as the hub is easily broken.
c. Tighten the rack shaft knee hub set screw.	
2. Adjusting the rack shaft lifting bracket.	2. Some time it is necessary to make this adjustment to prevent the rack shaft lifting bracket hook from slipping off the bell crank.

a. Loosen the rack shaft lifting bracket setscrew.	a. Be sure to turn it to the left to loosen it, otherwise the lifting bracket may be broken.
b. Turn the lifting bracket.	b. Hold all components in desired position.
c. Tighten the rack shaft lifting bracket setscrew.	c. Do not overtighten.

Safety precautions

1. When removing the bobbin case from the 31-15 Sewing Machine, the needle bar must be in its highest position to prevent needle breakage.

2. Keep your fingers away from the needle at all times.

3. Keep your head away from the moving parts of the face assembly, such as, the needle and presser bar assembly and the thread take-up lever.

B. PERFORMANCE CHECKING STANDARDS

1. The point of the shuttle on its forward stroke must pass 1/16 of an inch above the top of the needle eye.

2. The presser foot must be aligned as so the needle will pass exactly in the middle between the two toes.

3. The hand lifting lever should have exactly 1 inch of slack.

4. The lock of the stitch must be in the center of the material.

SECTION XVI

TROUBLESHOOTING MODEL 31-15 SEWING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the subject of troubleshooting the Model 31-15 Sewing Machine.

2. By troubleshooting we mean, being able to identify and correct the malfunctions that will cause your machine to function improperly.

3. A sewing machine operator normally is judged by his performance. An operator should know at once where the malfunction of his machine is located. The ability to do this, he is able to correct the malfunction safely and quickly.

B. Objective

As a result of this instruction, the student, given appropriate references, tools, supplies, troubleshooting chart, and model 31-15 sewing machine with eight malfunctions as outlined in troubleshooting chart, will be able to detect and correct all previously established malfunctions set up by the instructor.

II. Presentation

A. The instructor will discuss a few of the most common malfunctions of the 31-15 sewing machine. He will also demonstrate the proper procedures followed in correcting the malfunctions. The following are the possible causes and also the remedies.

1. Needle Breakage

a. Presser foot may be too loose. - Tighten the presser foot so that the needle will not hit it during operation.

b. Needle loose in the needle bar. - Tighten the needle clamp screw.

c. Improper class and variety of the needle. - Replace the needle with the correct size (16 x 87).

d. Operator pulling on fabric. - Let the machine feed the material through, do not push or pull the material.

2. Needle Thread Breakage

a. Tension not properly adjusted - If the lock of the stitch is showing on the bottom of the material, the needle thread tension is too loose and should be tightened. If the lock of the stitch shows on the top of the material this indicates the needle thread is too tight.

b. Incorrect size or twist of thread - Use a left twist thread, and a size 40/3 thread is normally used on the 31-15 sewing machine.

c. Damp or defective thread - Thread should be stored in a dry area, damp or wet thread will become mildew and rot.

d. Machine incorrectly threaded - In some instances the thread will catch underneath the cone of thread and become locked on the thread stand. Make a visual inspection of the thread at all the threading points and make certain that it is threaded in the proper sequence.

e Thread take-up spring out of adjustment - Set the take-up spring to the proper position so that it has the proper tension on the thread as the needle penetrates through the material.

f. Sharp edges on the shuttle race assembly - Inspect the shuttle race, shuttle, bobbin case and tension controller for sharp or rugged edges.

g. Bent or blunted needle - Replace the needle with the proper size.

3. Bobbin Thread Breakage

a. Damp or defective thread - Replace the thread with a more durable thread.

b. Bobbin wound too full - When this situation is present, the bobbin cannot turn freely in the bobbin case, causing excess tension and breaking the thread. Unwind the excess thread from the bobbin allowing the bobbin to rotate freely in the bobbin case.

c. Bobbin case covered with excess oil, dirt or lint - Clean the bobbin case and shuttle race assembly, lubricate as per instructions.

d. Tension too tight - Loosen tension on the bobbin case.

e. Incorrect threading - Bobbin thread should be placed under tension spring and bobbin placed in the case in such a manner that it turns clockwise as it unwinds.

f. Sharp edges on shuttle, bobbin case, bobbin or needle - Inspect all these areas and make corrective adjustments as necessary.

4. Material Not Feeding Through Machine

a. Stitch regulator set too short - Move the stitch regulating thumb screw to the proper position for normal operation, approximately midway, (14-16 stitches per inch).

b. Presser foot improperly adjusted - Lack of pressure on the presser bar, adjust the presser bar with the required pressure and the hand lifting lever with a one (1) inch slack.

5. Machine Skipping Stitches -

a. Improper timing of the needle with the shuttle point. - The needle bar may be out of adjustment. When the needle and shuttle are correctly timed, the point of the shuttle on its forward stroke passes across the diameter of the needle at a point 1/16 inch above the eye of the needle when the needle is on its up stroke.

b. Needle not installed properly or wrong class and variety of needle - The long groove of the needle when installed should be to the operator's left. Use the proper size needle (16 x 87).

6. Seam Draws

a. Threads are too tight - Adjust tension threads.

b. Stitches are too long for the fabric - Make adjustment to feed regulating thumbscrew for proper stitch length.

7. Stitches Uneven or Pile Up.

Presser foot out of adjustment - Adjust the presser foot pressure.

8. Feed Dog Strikes Throat Plate

Feed dog out of adjustment - Report this condition to your supervisor.

9. Machine Vibrates

a. Belt too tight - Replace with larger belt.

b. Pulley with balance wheel mounted improperly - Report this condition to your supervisor.

10. Any trouble that is beyond the ability of the operator to remedy must be reported according to the instructions given in TM 38-750.

TROUBLESHOOTING MODEL 31-15 SEWING MACHINE

PRACTICAL EXERCISE

I. Introduction

This practical exercise is to enable the student to apply what he has learned during this period of instructions. The student will be able to identify and correct the malfunctions normally found on a 31-15 sewing machine.

II. Study Reference: TM 10-3530-203-10, Section IV, Pars 66-77, Pgs 117-118.

III. Supplies, Tools and Equipment Required

- 31-15 Sewing Machine
- Screwdriver
- Thread
- Rags (cleaning)
- Oil Can

IV. Direction to Students

1. The instructor will create an unspecified number of malfunctions on each machine without the presence of the student.

2. The student will return to his machine, identify, and correct the malfunctions on his machine.

3. The student will observe all safety precautions and workmanship in accordance with preceeding irstructions on safety.

4. The student will not turn the power source on until he is certain that all visual malfunctions have been corrected. When he feels that he is ready to test his machine, the student must have the approval of the instructor to turn on the power source.

NOTE: ORIGINAL PAGE 16.05 HAS BEEN OMITTED; HOWEVER ALL MATERIAL HAS BEEN INCLUDED.

V. Performance Standards

The performance standards will be set up by the instructor for each individual machine, because of the variety of malfunctions that were created on each machine.

VI. Job Breakdown

A. The student will perform his practical exercise in accordance with the instructions of the previous hour and the information of the preceeding pages of Section XVI.

B. In the event the student locates a malfunction unfamiliar to him, call the instructor immediately.

SECTION XVII

CLEANING SHUTTLE RACE ASSEMBLY MODEL 31-15 SEWING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the disassembly, cleaning, lubricating, and reassembly of the shuttle race assembly of the 31-15 sewing machine.

2. During the process of sewing the various articles of clothing, the machine will pick up or accumulate a lot of dirt and lint especially in the shuttle race assembly. For this reason the shuttle race must be removed and cleaned frequently. Proper cleaning will insure proper operation and a long trouble-free life for the machine.

B. Objective

As a result of this instruction, the student, given appropriate references, tools, supplies, and Model 31-15 sewing machine, will be able to remove the shuttle race assembly as outlined in the appropriate technical manual, thoroughly clean all parts with cleaning solvent to the satisfaction of the instructor, reassemble the shuttle race assembly according to the technical manual, lubricate the shuttle race according to detailed lubrication instructions, and correctly replace shuttle race assembly in machine following instruction outlined in technical manuals.

II. Presentation

A. Removing, Cleaning, and Replacing Shuttle Race Assembly

1. Normal operation of shuttle - The shuttle race, which is held

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in place by two screws, does not move but holds the shuttle body. As the shuttle body is oscillated back and forth inside the shuttle race,the point of the shuttle body catches the needle thread above the eye of the needle and forms the loop, which is tightened into a lock stitch by the thread take-up lever on its up stroke.

2. Removing and Cleaning Assembly - To clean the shuttle body and shuttle race or to install new parts in the shuttle race assembly, the operator or mechanic must remove the shuttle race assembly. If the needle and shuttle are in time, the shuttle driver and needle can be brought into the correct positions for removing the shuttle race assembly by turning the balance wheel forward until the needle bar is at its highest point. If the needle and shuttle are not in time, the shuttle driver must be brought into the right position by turning the balance wheel until the driver, while still in the shuttle race is in a vertical position towards the back of the machine. This position is important because the shuttle race assembly cannot be disengaged from the shuttle driver if the driver is in any other position. After bringing the shuttle driver in the correct position, proceed as follows:

a. Take out the two shuttle race screws.

b. Slip the assembly to the left. Do not bend the shuttle race cap against the shuttle driver point while disengaging the race.

c. If the bobbin case is still in the race assembly, remove it. Then rotate the shuttle body in the shuttle race channel and draw it out the back of the shuttle race.

d. Disassembly shuttle race assembly as prescribed in job breakdown.

e. Use dry-cleaning solvent or diesel fuel oil once each week to flush out all parts. (Use of gasoline for this purpose is prohibited) After washing, dry all parts thoroughly and lubricate the machine.

f. Reassemble the shuttle race assembly with the instructions prescribed in the job breakdown.

3. Replacing assembly - To replace the shuttle race assembly proceed as follows:

a. Hold the shuttle race in your left hand, with the cap up, and with its front side to your left.

b. Put the shuttle body back into the shuttle race, with the stud of the shuttle body pointing to your left and with the point of the shuttle body pointing down.

c. Turn the balance wheel to bring the shuttle drive into the proper position.

d. Replace the race assembly so that the shuttle body engages the shuttle driver and fits snugly against the bed.

e. Replace the shuttle race screws and tighten them firmly. If these screws are loose, the point of the shuttle body will clip the needle.

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CLEANING SHUTTLE RACE ASSEMBLY MODEL 31-15 SEWING MACHINE

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the student will have the opportunity to disassemble clean and reassemble the shuttle race assembly of the model 31-15 sewing machine.

II. Study Reference

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop and Clothing Repair Shop. Chapter 6, Sec II and III.

III. Supplies, Tools, and Equipment Required

1. Screwdriver (1 per student)
2. Lightweight oil (1 can per student)
3. Model 31-15 sewing machine (1 per student)
4. Cleaning rags (ample supply)

IV. Directions to the Students

Follow the step procedures as outlined in paragraph VI. This practical exercise will emphasize that speed to remove, disassemble, clean, assemble and replace the shuttle race assembly comes only with correct practice and procedures. As skill improves, speed will increase.

V. Performance Standards

The performance standards A, Par VI are established to be used following the student performance, this will enable the instructor to observe the student's performance and inspecting the final results of this practical exercise.

VI. Job Breakdown

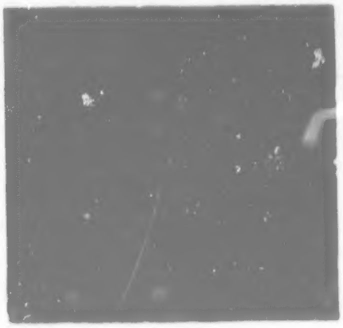
A. The performance standards established and which will be used by the instructor are as follows:

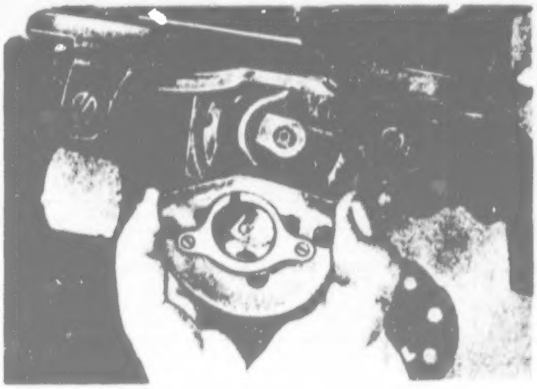
1. Proper use of tools by the student.
2. Student should lay out parts in proper sequence.
3. Make certain the students clean the dirt and/or lint out of the shuttle race assembly.
4. The student should lubricate the shuttle race assembly.
5. There should not be any bind with the shuttle body as the shuttle race screws are being tightened.

B. The procedures for removing and disassembly and reassemble are listed to the left of the page. The key points which correspond in number to the procedures are listed to the right of the page.

REMOVAL AND DISASSEMBLY

1. Remove shuttle race screws and shuttle race assembly.	1. a. Be sure to have needle bar connecting link in its highest position. b. Turn screws to the left.





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2. Remove shuttle body from the shuttle race.

2. a. Have back facing up.

   b. Turn shuttle body and pull up until body slides out of race.

3. Remove position plate screws and position plate.

3. a. Place shuttle race down on machine table top (to eliminate screw driver injuring hand).

   b. Turn the screws to the left to remove.

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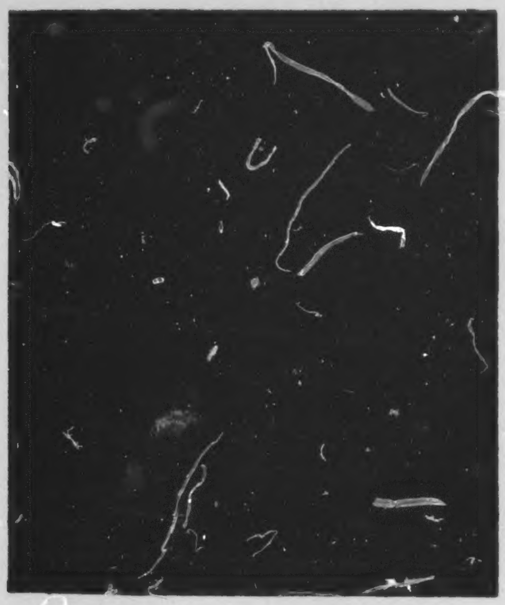
4. Remove shuttle race back spring screw and shuttle race back spring.



4. a. Same as key point 31-a.

b. Turn the screw counterclockwise to remove.

5. Remove the shuttle race back.

5. Lift shuttle back straight up off the dowel pins.

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6. Shuttle race body.

Figure 43

6. This completes the disassembly of the race assembly.

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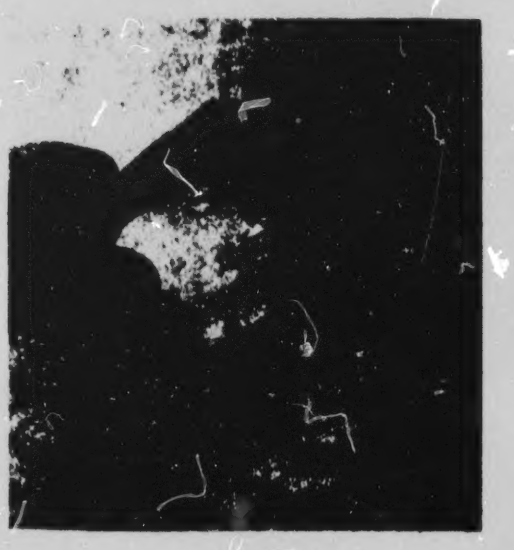
REASSEMBLY AND REPLACE

1. Shuttle race body.	1. Make sure that the side with the dowel pin is facing up.

2. Replace the shuttle back onto the shuttle race body.	2. a. Beveled edges on the opening of the shuttle back must be facing away from the shuttle. b. The opening in the shuttle back must go to the top of the shuttle race body.



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3. Replace shuttle race back spring and screw on back of shuttle race and tighten screw.	3. a. Make sure the shuttle back spring is evenly spaced between the dowel pins. b. The hold in the shuttle back spring must be lined up with the hole in the shuttle race body.

4. Replace position plate and screw.	4. Be sure that screws are tightened and holes are lined up.

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5. Replace shuttle body into shuttle race assembly.

5. a. Be sure to place point of shuttle body in first at the bottom of shuttle race assembly.

   b. Place shuttle body in from back side of shuttle race assembly.

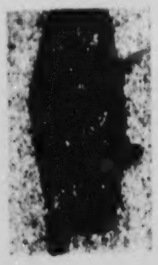
   c. Be sure that the shuttle body center stud is facing towards the position plate.

6. Replace shuttle race assembly and screw into machine and tighten screws.

6. a. Be sure the needle bar connecting link is in its highest position before replacing shuttle race assembly into the machine.

   b. Be sure screws are lined up with holes in machine.

   c. Make sure screws are tight.



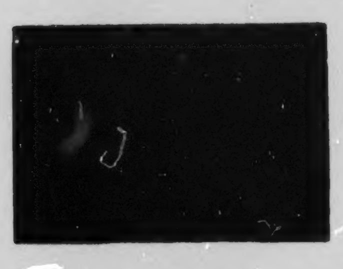


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Figure 44

17.08A

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SECTION XVIII

OPERATOR MAINTENANCE OF MODEL 47W70 DARNING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss operator's maintenance of the model 47W70 darning machine. This instruction will include detailed lubrication instructions, before, during, and after operation preventive maintenance services, safety precautions, and the use of the operator's check list.

B. Objective

As a result of this instruction, the student, given appropriate references, lubrication chart, detailed lubrication instructions, model 47W70 darning machine, and appropriate tools and supplies, will be able to lubricate the model 47W70 darning machine with prescribed lubricant according to the service intervals and points of application specified on lubrication chart; given an operator's check list and safety standards, the student will be able to perform "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards.

II. Presentation

A. The instructor will go over the lubrication points of machine model 47W70.

1. Detailed lubrication information.

a. General - keep all lubricants in closed containers, and store them in a clean, dry place, and away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean, and ready for use.

b. Points of lubrication - the model 47W70 darning machine has a hook and saddle assembly. This is far different than the shuttle race assembly of machine model 31-15. The hook in the model 47W70, rotates in one direction, at a top speed of 5600 RPM. This is much faster than the shuttle oscillates in machine model 31-15, and for this reason, lubrication of the model 47W70 is a little different than the model 31-15. This difference is what you should understand completely. The hook and saddle has a green lubricating felt, (green when it is dry, and black or dark when it is soaked with oil). It should be kept soaked with oil at all times when operating the machine. (Refer to TM 10-3530-203-10 Operator's Manual Textile Repair Shop, Trailer-Mounted, York Astro Model 08700477 Army Model SPV 35 (FSN 3530-819-2008) and Clothing Repair Shop, Trailer Mounted, York Astro Model D8700337 Army Model SPV 34 (FSN 3530-819-2007) figures 45, 47, 49, 51 and 53, para 53b). The numbers inserted on the borders of each lubrication order, are listed consecutively, and refer to specific lubrication points. Follow each lubrication order to which they apply.

2. Cleaning - keep all external parts that do not require lubrication free of lubricants. Before lubricating the equipment, wipe dirt and grease from all lubrication points.

3. Operation immediately after lubrication - operate the machine immediately after lubricating to distribute the oil on all moving parts.

B. The instructor will go over the before, during, and after operation preventive maintenance services, in accordance with the operator's check list, and safety precautions. (Daily Preventive Maintenance Services.)

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1. Before-operation services - before beginning to operate the machine the operator should:

a. Examine the drive belt and controls.

b. Inspect the entire machine for damage.

c. See that the sewing lamp is functional.

d. Test the machine for adjustment.

2. During-operation services - while operating the machine the operator should:

a. Lubricate the machine every 4 hours of operation.

b. Check, and lubricate if necessary, the oil felt (located in the top of the saddle assembly) each time a bobbin is replaced.

c. Clean dust, grit, or lint out of the bobbin case and hooks.

d. Make adjustments required by the nature of the fabric being sewn.

e. Replace broken needles, and keep the throat plate, and presser foot tight.

3. After-operation services - before leaving the machine after a day's run, the operator should:

a. Clean dirt, lint, and grit, out of all moving parts.

b. Lubricate the machine.

c. Leave a test patch under the presser foot (to indicate the machine will operate).

d. Turn off motor.

e. Cover machine head.

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C. Lubricate model 47W70 machine.

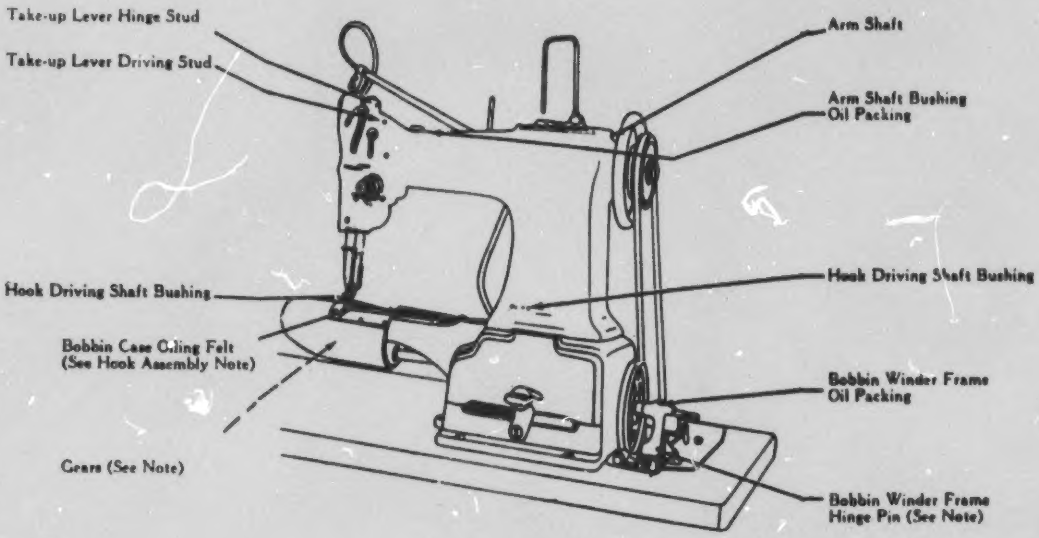
1. Students will lubricate machine using the lubrication chart in TM 10-3530-203-10, Pg 101, 102, and 103 or instructions in the following pages.

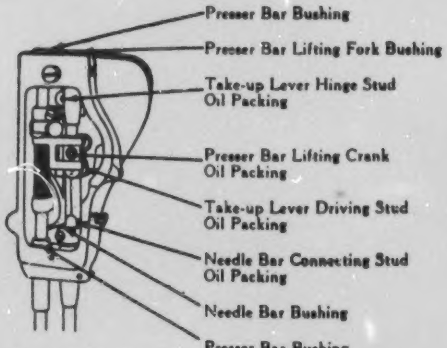
2. Instructor will supervise and assist the students during lubrication.

D. Safety Precautions - All the safety precautions discussed during the previous instructions on the model 31-15 sewing machine will be adhered to during this period.

LUBRICATION CHART

MACHINE, SEWING (SINGER 47w70)


Take-up Lever Hinge Stud
Take-up Lever Driving Stud
Hook Driving Shaft Bushing
Bobbin Case Oiling Felt (See Hook Assembly Note)
Gears (See Note)
Arm Shaft
Arm Shaft Bushing Oil Packing
Hook Driving Shaft Bushing
Bobbin Winder Frame Oil Packing
Bobbin Winder Frame Hinge Pin (See Note)


Presser Bar Bushing
Presser Bar Lifting Fork Bushing
Take-up Lever Hinge Stud Oil Packing
Presser Bar Lifting Crank Oil Packing
Take-up Lever Driving Stud Oil Packing
Needle Bar Connecting Stud Oil Packing
Needle Bar Bushing
Presser Bar Bushing

FACE ASSEMBLY

—KEY—

LUBRICANT	ALL TEMPERATURES
MO—OIL, lubricating	
BR—GREASE, ball and roller bearing	

—NOTES—

Twice every day lubricate these points indicated above by arrows with one to three drops of MO. CAUTION: Do not oil moving parts to excess nor ignore the lubricating interval. (See additional notes.)

BOBBIN WINDER—Every day lubricate the Bobbin Winder Frame Oil Packing and Bobbin Winder Frame Hinge Pin with one or two drops of MO.

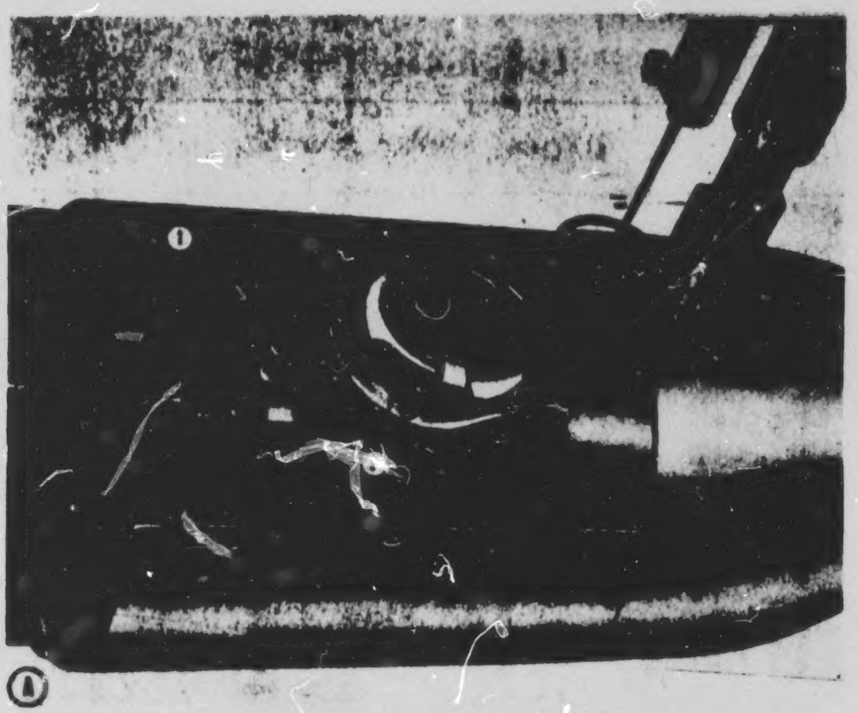
GEARS—Every day lubricate the Hook Bevel Gear and Hook Bevel Pinion with three to four drops of MO.

HOOK ASSEMBLY—The small green felt pad on the side of the bobbin case should be kept wet with oil to lubricate the hook race. When this pad is wet it appears nearly black and when it appears light green it is dry. When the machine is new, oil should be applied to this felt pad each time a bobbin is replaced.

MOTOR—Every 3 months lubricate the rotor shaft fitting with 3 to 5 strokes of a gun containing BR. The transmitter bearing may be lubricated in a similar manner. Every month fill the waste-packed oil reservoir at the terminal end of the rotor shaft with MO.

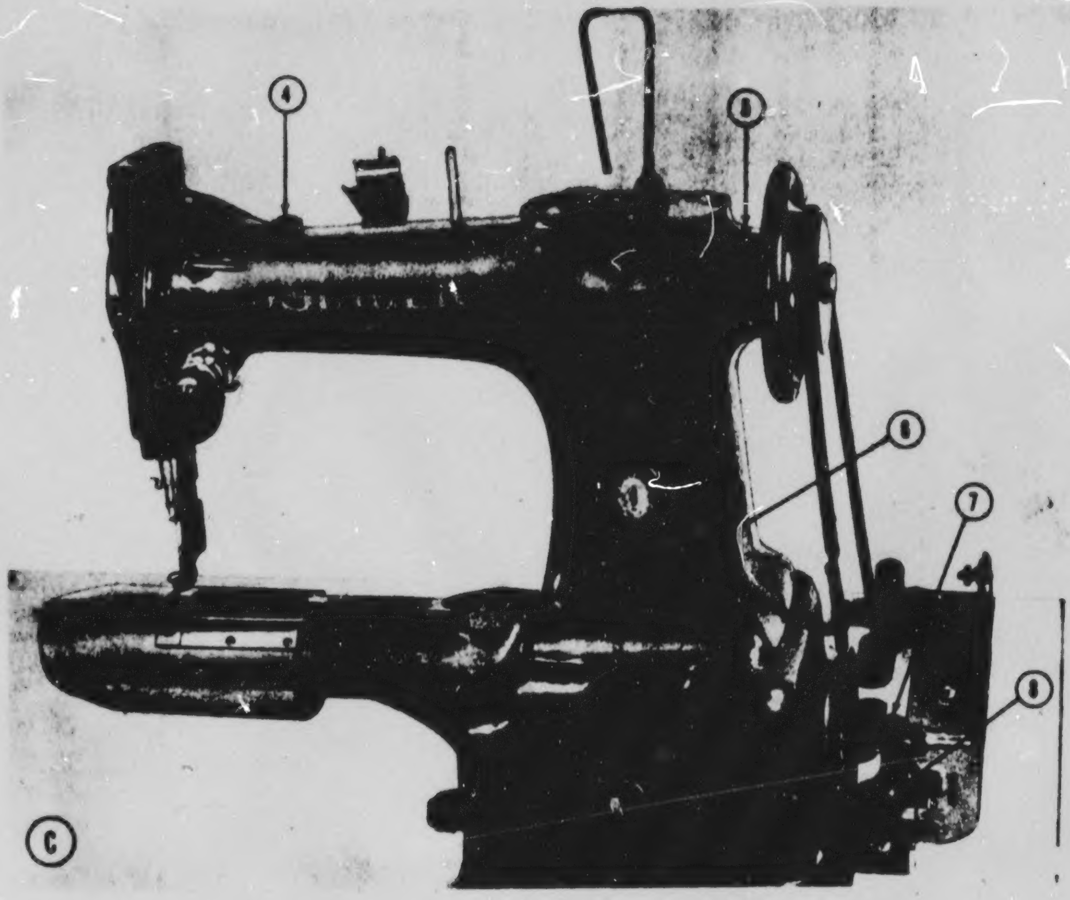
DO NOT LUBRICATE—Arm Shaft Connection Belt. Oil will have deteriorating effect on the material which compose this belt.

Figure 45



(1). Lubrication points on darning machine.

(1) **— Continued.**



(3) — **Continued.**

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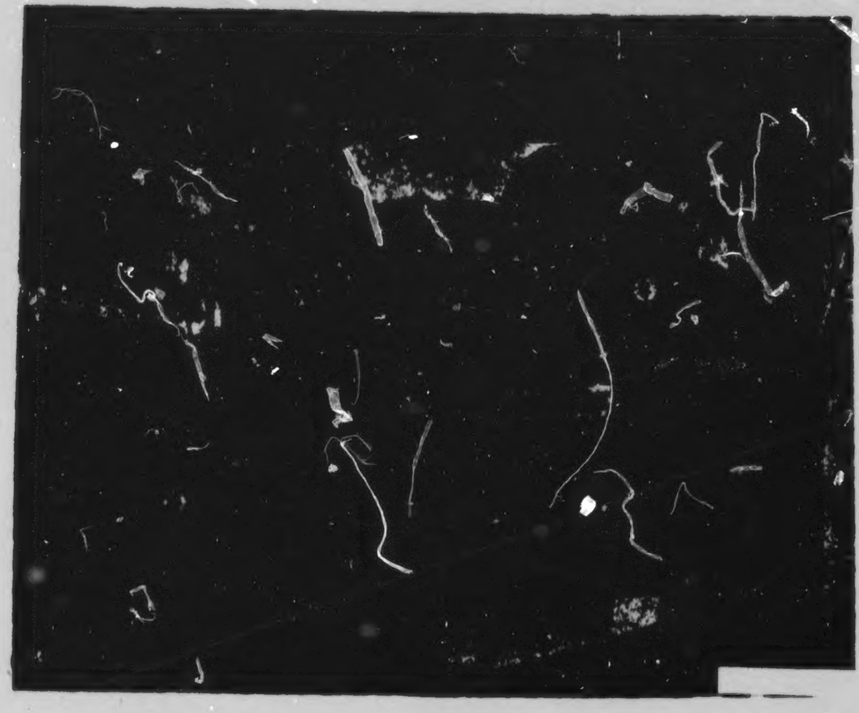
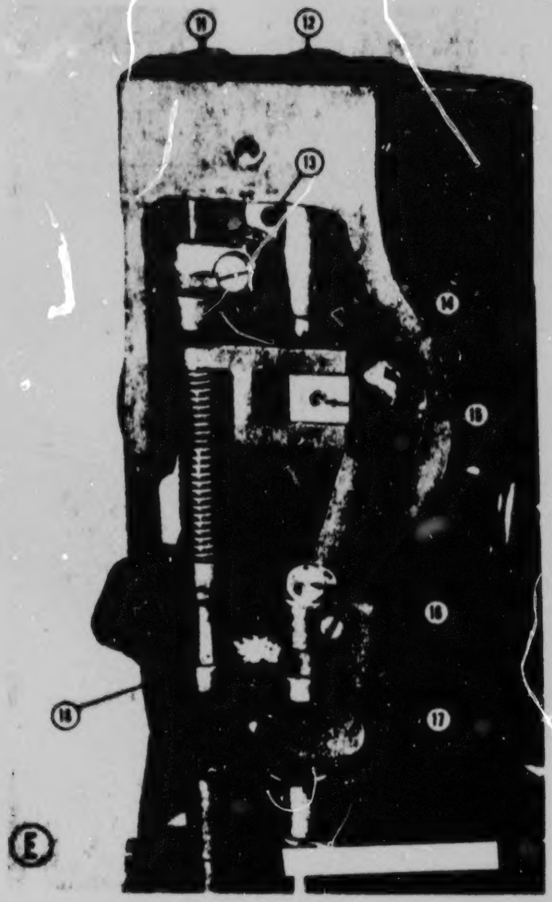


(4) — Continued.

Figure 46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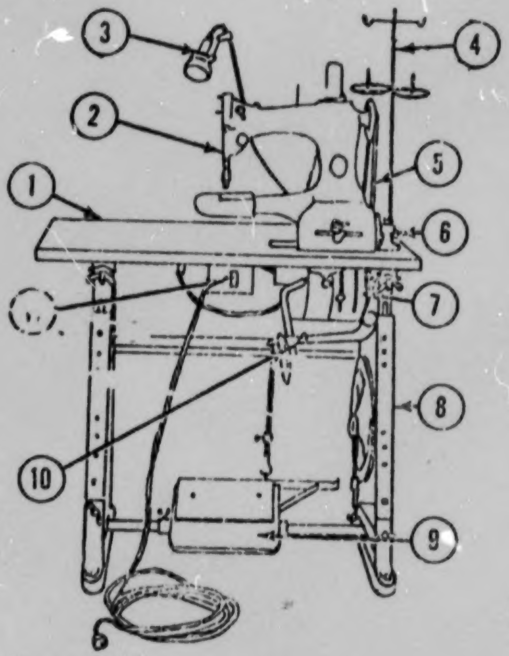
(5) — Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 10-3530-203-10 MACHINE, DARNING



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.	

Figure 4[illegible]

ITEM		PAR REF
2	DARNING MACHINE HEAD. Inspect the darning machine head for dirty surfaces and grease deposits; for bent, broken, loose, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting.	
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and for loose mounting. Inspect for a dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and for loose mounting. Check for a 3/4-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.	
6	BOBBIN WINDER. Inspect the bobbin winder for bent, broken, loose, or missing components, and for loose mounting. Inspect for excessively worn leather brake; for incorrect tension of the thread tension spring; and for improper adjustment of the pulley with the drive belt.	
7	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	

Continued.

ITEM		PAR REF
8	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
9	STARTING TREADLE. Inspect the treadle for bent, broken, or loose components, and loose mounting. Operate the treadle to see that the pulley brake lever engages the motor drive pulley with the drive motor when the treadle is depressed. Make certain the pulley brake lever disengages the drive pulley from the motor and stops the pulley when the treadle is released (during operation).	
10	KNEE LIFTER. Inspect the knee lifter for bent, broken, loose, or missing components, and for loose mounting. Operate the knee lifter to see that it raises and lowers the presser foot.	
11	MOTOR SWITCH. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off. NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	

Continued.

SECTION XIX

PREPARATION FOR OPERATION MODEL 47W70 DARNING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the methods and procedures followed in preparation for operation of the model 47W70 darning machine. The last period of instructions the instructor stressed the importance of lubrication and preventive maintenance services. To properly prepare your machine for operation is equally important to the operator, it will enable him to be an efficient sewing machine operator.

B. Objective

As a result of this instruction, the student, given appropriate references, unthreaded model 47W70 darning machine, empty bobbin, threading charts, appropriate needles, tools, and supplies, will be able to prepare model 47W70 darning machine for operation by removing the bobbin from the machine, threading the bobbin winder according to thread chart, winding a bobbin, threading the bobbin case by correctly placing bobbin in case, installing needle in needle bar with groove of needle to operator's left, and threading machine according to threading chart.

II. Presentation

A. Removing the bobbin from machine model 47W70.

1. To remove the bobbin, open the bed slide stop. Remove the bed slide, insert the forefinger under the latch, raise the latch and lift out bobbin.

2. Place bobbin on spindle of bobbin winder.

B. Threading the bobbin winder (winding the bobbin).

1. To wind thread on the bobbin, make sure you place the bobbin on the bobbin winder spindle and push it on the spindle as far as it will go.

2. Use the cone of thread on the right side of stand, place the thread over the thread unwinder.

3. Bring the thread down and through the hole in the tension bracket on the bobbin winder.

4. Place the thread on the back of the tension assembly (the thread must be pulled between the tension disks).

5. Bring the thread from the underside of the tension assembly to the bobbin.

6. Pass the thread around the bottom side of the bobbin, wind the end of the thread around the bobbin several times.

7. Push the bobbin winder pulley over against the machine belt by pressing on the stop latch thumb lever, and see that the automatic stop latch catches and holds the pulley against the driving belt.

8. The bobbin may be wound while the machine is stitching. However, if no fabric is under the needle see that the needle thread is pulled out of the eye of the needle.

C. Threading the bobbin case, (inserting bobbin in bobbin case).

1. When the bobbin is placed in the case, the thread should pull counterclockwise around the bobbin and back into the thread slot in the bobbin case.

2. Place the bobbin over the latch and center stud of the bobbin case, and past down the latch.

3. Draw the thread into the slot between the bobbin case opener and the triangular projection on the bobbin case.

4. Lift about 2 inches of bobbin thread above the throat plate, and close the slide plate, but remember to leave enough space between the slide and the throat plate for the thread to slip through when it is caught by the needle thread.

5. A convenient way to thread the case and catch the bobbin thread in one operation is as follows:

a. Place the bobbin in the case with the thread in the slot.

b. Thread the needle, raise the presser foot, and with a light tension, hold the needle thread towards the upright.

c. Turn the balance wheel towards you until the needle descends and comes back up.

d. If the needle is correctly timed, the hook will catch the needle thread and pass it around the bobbin case.

e. The needle thread will catch the bobbin thread, pull it under the triangular projection on the bobbin case, under the bobbin case tension spring, and out through the hole in the throat plate.

D. Installing the needle.

1. Select a good needle of class 126, variety 3, and of suitable size for the work.

2. Never use a bent needle or one with a blunted point.

3. Have the needle bar at its highest point.

4. Loosen the needle setscrew and remove the old needle.

5. Set the new needle as far up in the needle bar as it will go,

with the long groove to the operator's left, and tighten the needle setscrew.

E. Threading the model 47W70 darning machine (needle thread).

1. The needle thread is usually taken from a cone on the left of the thread stand.

2. To thread the machine, refer to job breakdown.

3. Instructor will demonstrate step-by-step procedure used in the threading.

4. Students will listen, observe, and perform as directed by the instructor.

PREPARATION FOR OPERATION MODEL 47W70 DARNING MACHINE

PRACTICAL EXERCISE

I. Introduction

The purpose of this practical exercise is to enable the student to properly prepare the model 47W70 darning machine for operation.

II. Study References

TM 10-3530-203-10 "Operator's Manual, Textile Repair Shop, Clothing Repair Shop, Sec III, Par 26. Pgs 33-39."

III. Supplies, Tools and Equipment Required

47W70 Darning Machine

Screwdriver

Thread

Test Material

IV. Direction to Students

Follow the step procedures as outlined in paragraph VI. for the preparation of the machine for operation. When in doubt the student should call on the instructor for additional assistance.

V. Performance Standards

The performance standards in Par VI A, are established to be used by the instructor for checking the final results of the students practical exercise.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Proper tools being used.
2. Needle installed properly (long groove to the operator's left).

3. Machine threaded properly.

4. The bobbin correctly wound (not too loose or too tight).

5. Proper installation of the bobbin.

6. Machine should be free of dirt and lint an properly lubricated.

B. The procedure for threading the model 47W70 darning machine are listed below and the following pages.

Threading the Model 47W70.

1. Pass the thread from the thread cone, up and over the thread unwinder.	1. a. Left hand twist thread. b. Thread is not under the thread cone. c. From right to left.
2. Pass the thread from back to front through the bottom hole of the thread guide.	
3. Pass the thread from the bottom eyelet of the thread guide to the top hole of the thread guide.	3. From right to left.
4. Pass the thread from the top hole of the thread guide to the top hole of the thread retainer.	4. a. Thread from right to left. b. Thread retainer removes kinks from the thread.
5. Pass the thread from the top hole through the middle hole of the thread retainer.	5. Thread from left to right when facing the sewing machine.
6. Pass the thread from the middle hole to and through the bottom hole.	6. Thread from the right to the left.
7. Pass the thread from the bottom hole of thread retainer to the thread tension assembly.	7. a. Down and between the tension disks. b. Thread pass from right to left.
8. Pass the thread from the tension disks around the tension stud and into the	

	fork of the front tension disk.		
9.	Pass the thread from the front tension disk to the thread controller spring.	9.	Thread passed under the thread controller spring so that the thread pulls against the spring.
10.	Pass the thread from the thread controller spring up and through the thread guide.	10.	Thread guide keeps the thread from becoming loose and twisted.
11.	Pass the thread from the thread guide, up to the thread take up lever.	11.	Thread the take up lever from right to left.
12.	Pass the thread from the thread take up lever down through the first thread guide.		
13.	Pass the thread from the first thread guide down through the second thread guide.		
14.	Pass the thread from the second thread down through the third thread guide.		
15.	Pass the thread from the third thread guide down through the thread guide on the needle bar bushing.		
16.	Pass the thread from the thread guide on the needle bar bushing, down through the needle bar thread guide.		
17.	Pass the thread from the needle bar thread guide to the needle.	17.	a. Thread needle from left to right. b. Make sure that the long grooves are to the left.

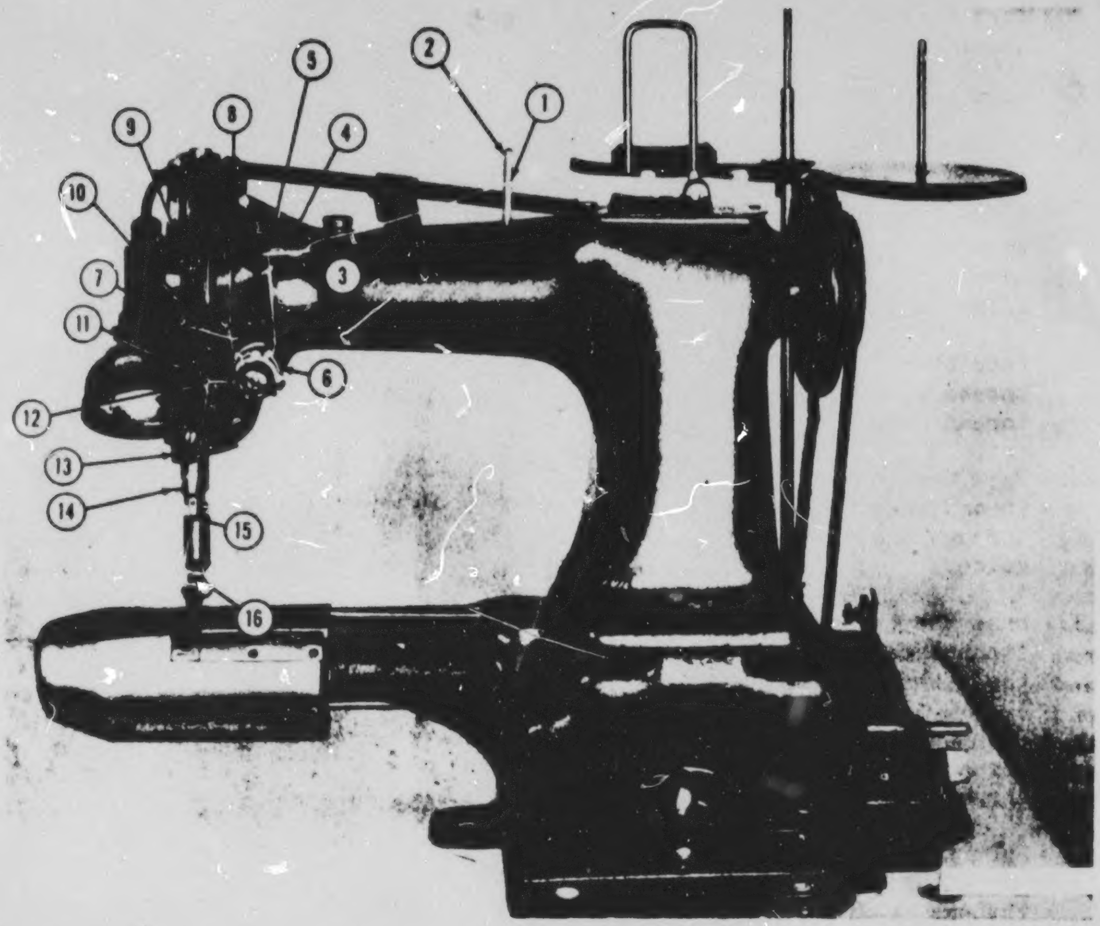

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Figure 48 - *Threading sequence for darning machine.*

SECTION XX

ADJUSTMENT AND OPERATION OF MODEL 47W70 DARNING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the various adjustments and operation of the model 47W70 darning machine. Your ability to make the proper adjustments when required will increase your efficiency as a sewing machine operator.

B. Objective

As a result of this instruction, the student, if given a model 47W70 darning machine that he previously prepared for operation, appropriate tools, supplies, references, timing and adjusting measurements, and deviation standards, will be able to adjust the motor clutch pedal to achieve the correct starting and braking action of machine, and time the needle bar with the sewing hook according to timing measurements, without deviation; given operation instructions on inserting and removing work, safety precautions in operation thread tension charts, appropriate references, and various pieces of material of different thicknesses, will be able to insert material of various thicknesses (one thickness at a time), stitch and make adjustments to presserfoot in accordance to the thickness of material inserted; adjust bobbin and needle threads in accordance with tension chart, wind the bobbin while sewing, make any necessary adjustments to the bobbin winder and bobbin winder tension to the satisfaction of the instructor, observe all safety precautions in operating and making adjustments; perform "during operation" preventive maintenance services in accordance with lubrication charts and operator's PM check list, remove work from machine to the satisfaction of the instructor, and perform "after operator's" preventive maintenance services according to operator's PM check list and TM 10-3530-203-10.

II. Presentation

A. Timing Hook with Needle.

The point of the hook on the model 47W70, rotates past the needle in about the same manner that the point of the shuttle oscillates past the needle on the model 31-15 sewing machine. When the needle on the model 47W70 is on its up stroke, the point of the hook passes across the center of the needle, about 1/16 of an inch above the eye. In passing the needle, the point of the hook must be as close to the needle as possible, without touching it. To time the hook of the machine, follow procedure listed below.

1. Slip the bed and cover off to the left.

2. Push aside the bed slide stop, and remove the bed slide.

3. Remove the throat plate.

4. Loosen the two hook bevel pinion setscrews, so that the pinion can be rotated without moving the hook driving shaft.

5. See that the needle is set up into the needle bar as far as it will go.

6. Turn the balance wheel over toward you, until the needle bar reaches its lowest position, and rises 3/32 of an inch. If the needle bar is marked, it should rise to the point where the lower mark on the needle bar is just visible below the needle bar bushing.

7. Hold the needle in that position, and with your fingers, turn the hook until the point of the hook is crossing the center of the needle, 1/16 of an inch above the eye.

8. With the hook so set, tighten the setscrews. Since the setscrews are not positioned or spotted in a notch, they must be set firmly to keep the pinion from slipping around on the hook driving shaft.

B. Raising or Lowering Needle Bar.

If the needle bar has not been marked at the factory with two lines around it about 2 inches from its bottom and, proceed as follows to raise or lower it.

1. Make certain that the hook is timed according to paragraph A, above.

2. Loosen the pinch screw.

3. Move the needle bar up or down as necessary to bring the eye of the needle 1/16 of an inch below the point of the hook, after the needle has risen 3/32 of an inch from its lowest point.

4. Tighten the pinch screw.

C. Setting Hook to or from Needle.

The point of the hook should pass the needle as close to the needle as possible without touching it. If the point of the hook strikes the needle, it will be blunted or broken. If it runs too far from the needle, it will either fail to catch the needle thread, or divide the strands and break the thread. If the hook needs to be set to or from the needle, proceed as follows:

1. Loosen the hook saddle screws, and tap the hook saddle to the right or left as necessary to bring the hook the proper distance from the needle.

2. Check the timing of the hook, and if necessary, time it according to paragraph A.

D. Motor Clutch Pedal

The clutch, which connects the machine driving pulley of the motor to the machine pulley, is operated by a pedal or treadle. To connect the motor with the machine, press on the treadle. The harder the treadle is pressed, the faster the machine runs.

E. Inserting Material in Machine

1. Turn the balance wheel toward the operator until the thread takeup lever is at its highest point.

2. Press the knee lifter to the right to raise the presser foot, or push the presser bar adjusting thumb screw backward or away from the operator, to riase thepresser foot.

3. Lay both threads (about 3 inches of each), back under the presser foot.

4. Place the item (material or garment) on the cylinder and cover of the machine, and flaten out the part of material to be darned.

5. Release the knee lifter to lower the presser foot, or push the presser bar adjusting thumb screw toward the operator, to lower the presser foot.

6. Hand-turn the balance wheel toward the front, and simultaneously hold the needle and bobbin threads, until a few stitches are made.

F. Adjusting Tension on Bobbin and Needle Threads.

Lock the bobbin and needle threads, when making the stitch, in the center of the material. If the tension on the needle thread is too tight, or if that on the bobbin thread is too loose, the needle thread will be straight along the upper surface of the material. If the tension on the bobbin thread is too tight, and if that on the needle thread is too loose, the bobbin thread will be straight along the underside of the material. If both threads are too tight, the material will be puckered and drawn together by the stitches, and the threads will break.

1. Tension on bobbin thread.

Adjust or regulate the tension on the bobbin thread, with the tension regulating screw located in the center of the tension spring on the outside of the bobbin case. Do not take the bobbin case out of the hook assembly to adjust the tension, but use a small screwdriver to turn the screw. Turn the screw to the right to increase the tension, and to the left to decrease the tension.

2. Tension on needle thread.

Adjust the tension on the needle thread, with tension thumb nut, located on the thread tension stud. Turn the thumb nut to the right, to increase the tension, and turn it to the left to decrease the tension on the needle thread.

G. Adjusting Length of Stitch

Adjust the length of the stitch at the time of sewing or stitching material, by moving or feeding the material. The length of the stitch, depends on how fast the material is fed to the machine.

H. Checking and Testing for Proper Operation.

Use a piece of test or scrap material to make a few stitches. Check the lock of the stitch. Adjust the tension on the threads as necessary.

I. Darning Material

Hand-turn the balance wheel toward the front, and simultaneously hold the needle and bobbin threads, until a few stitches are made. Press the treadle to engage the clutch to start the machine. Hold the material to be darned with both hands, one hand on one side, and one hand on the other side of the material close to the presser foot. Start darning, by making a line of stitches a little to the left of the hole, and a little longer than the width of the hole. Continue to make parallel lines of stitches across the hole, moving the material backward and forward, and, at the same time, gradually moving the material sideways until the hole is covered with lines of stitches running across the hole.

J. Removing Material from Machine

Release the treadle to stop the machine. Hand turn the balance wheel, until the thread takeup lever is at its highest point. Press the knee lifter to the right to raise the presser foot, and to release the tension on the thread. Move the material, with threads attached, toward the back of the machine, and cut the threads close to the place that has been darned. Turn off power source.

K. Adjusting Bobbin Winder

If the bobbin winder is properly adjusted, the automatic stop latch will operate, and throw the bobbin winder pulley away from the machine belt when the bobbin is full.

1. To change the amount of thread wound on the bobbin before the automatic release operates, use the bobbin winder stop latch screw. To wind more thread on the bobbin, turn the screw to the right. To wind less thread on the bobbin, turn the screw to the left. If this screw does not provide sufficient adjustment, loosen the wood screws, which hold the base of the bobbin winder to the stand top. Then move the base backward or forward as necessary.

2. If the thread fails to wind evenly on the bobbin, or piles up on one side of the bobbin, loosen the screw which holds the tension bracket, and move the bracket to the right or left as required. Then tighten the screw.

L. Safety Precautions

1. While making adjustments, the operator must be careful to cut off the motor switch, or remove the driving belt before he removes needles or bobbins, or performs other adjustments, which bring his fingers under the needle. Otherwise, he may accidently start the machine by stepping on the foot treadle pedal and injure his hand or fingers.

2. While sewing or/operating the machine, the operator must at all times, be careful to keep his fingers away from the needle.

ADJUSTMENT AND OPERATION OF MODEL 47W70 DARNING MACHINE

PRACTICAL EXERCISE

I. Introduction

The purpose of this practical exercise is to have the student make the various adjustments that will be required of him as an operator of the 47W70 darning machine.

II. Study References

TM 10-3530-203-10 Operator's Manual Textile Repair Shop, Clothing Repair Shop. Section III, Par 27, Pgs 39-43.

III. Supplies, Tools, and Equipment Required

47W70 Darning Machine

Screwdriver

Thread

Rags (cleaning)

Oil Can

Test Material

IV. Direction to Students

1. The student will make the various adjustments as outlined in paragraph VI.

2. In addition to making the various adjustments to the model 47W70 darning machine, the student must observe all the safety precautions observed in the previous hours of instructions, also perform preventive maintenance services to include "before, during and after" operation services.

V. Performance Standards

The performance standards that will be used by the instructor are listed in paragraph VI, A. These performance standards are used to observe the students workmanship and to check the final results of the students practical exercise.

VI. Job Breakdown

A. The performance standards to be used by the instructor during the practical exercise as follows:

1. Proper use of tools by students.
2. The timing adjustments properly performed.
3. Machine threaded correctly.
4. No binding action on the moving parts.
5. Student observing all safety precautions.
6. Preventive Maintenance Services performed.

B. The procedures to be followed during the practical exercise in making adjustments and operation of the model 47W70 darning machine are listed below:

Setting the Needle Bar

1. Remove face plate screw.	1. a. Turn to left to remove. b. Stand the screw on its head on the left of the tabletop.
2. Remove face plate.	2. Lay face on the left of the tabletop next to the screw.
3. Loosen the needle bar pinch screw.	3. a. Turn to the left to loosen. b. Loosen about three turns.
4. Move the needle bar up or down as necessary to bring the eye of the needle 1/16" below the point of the hook.	4. a. Make sure the needle is of correct class and variety (126x3). b. Long groove of needle must be to the operator's left. c. Make sure sewing hook is timed before setting needle bar (see timing sewing hook).
5. Tighten the needle bar pinch screw.	5. Be careful not to break the needle screw.

Timing the Sewing Hook with the Needle

1. Remove the bed and cover.	1. Cover is moved by pulling it to the operator's left.
2. Push aside the bed slide stop.	2. The bed slide stop holds the bed slide in position.
3. Remove the bed slide.	3. a. Covers the sewing hook. b. Allows the cloth to move freely.
4. Remove the throat plate.	4. a. Remove the two throat plate screws. b. Make sure that the heads are not buried.
5. Loosen the two sewing hook pinion set screws.	5. a. Do not remove screws. b. Screws must be loose so that the pinion can be rotated without moving the hook driving shaft.
6. Needle is set up into the needle bar as far as it will go.	6. Make sure by loosening the needle set screw and push the needle up.
7. Turn the balance wheel towards you until the needle bar reaches its lowest position and rises 3/32 of an inch.	7.a. Make sure that the balance wheel is turned towards the operator. b. If the needle bar is marked, it should rise to the point where the bar is just visable with lower mark on the needle bar below the needle bar bushing.
8. Hold the needle bar in that position and with your fingers turn the hook until the point is crossing the center of the needle 1/16" above the eye.	8. If the eye of the needle is not 1/16 of an inch below the point of the hook. Set the needle bar (see setting needle bar).
9. With the hook set in this position, tighten the set screws.	9. The set screws are not positioned or spotted in a notch.

Adjusting the Needle and Bobbin Thread Tension

1. To increase the needle thread tension turn the thumb nut.	1. a. The thread controller must be adjusted. b. Turn the nut to the right.

2. To decrease the tension, turn the thumb nut.	2. To the left.
3. The bobbin thread tension is regulated by the screw in the center of tension spring on the outside of the bobbin case.	3. a. The bed slide must be opened to make the adjustment. b. Before adjusting the tension see that there is not dirt or lint under the spring.
4. Increase the tension.	4. Turn the screw to the right.
5. Decrease the tension.	5. Turn the screw to the left.

Adjusting the Presser foot for Material being used.

1. Loosen the presser bar adjusting collar thumb screw.	1. a. For shelter-halves, and trousers, b. Do not remove the thumb screw. c. This will shorten the stroke of the presser foot and give tension for light weight materials.
2. Pull the thumb screw towards the operator.	2. Such as field packs and heavy weight canvas.
3. Loosen the presser bar adjusting collar thumb screw.	3. Do not remove the thumb screw.
4. Push the thumb screw away from the operator.	4. This will increase the stroke of the presser foot for heavy weight materials.

Adjusting the Bobbin Case Opener

1. Open the bed slide cover.	1. Swing out the bed slide stop.
2. Place the bobbin case opener lever in most rear position.	2. Turn balance towards operator.
3. Loosen the bobbin case lever fulcrum screw.	3. a. Do not remove screw. b. Use the proper screwdriver.
4. Pull the lever tight against the square projection on the bobbin case.	4. The bobbin case opener lever fulcrum must be in its maximum rear position.
5. Tap or move the lever away from the square projection on the bobbin case.	5. The distance between the lever and projection is the thickness of the thread.

6. Tighten the bobbin case lever fulcrum screw.	6. a. Use the proper screwdriver. b. Make sure the screw is tight. c. Check machine for a bind, if machine binds, readjust the opener lever.

Setting the Sewing Hook to or from Needle

1. Remove bed (cylinder) and cover.	1. Pull cover to operator's left.
2. Lower the needle bar.	2. a. Turn the balance wheel towards operator. b. Until the sewing hook point is centered with the needle.
3. Loosen the two (2) sewing hook saddle screws.	3. a. Do not remove screws. b. Use the proper screwdriver.
4. Move the sewing hook saddle into or away from the needle.	4. a. Until the point of the sewing hook is close to the needle as possible without touching it. b. The needle must be straight.
5. Tighten the two (2) sewing hook saddle screws.	5. a. Use the proper screwdriver. b. The screws must be tight. c. Recheck for proper clearance between sewing hook and needles.

SECTION XXI

TROUBLESHOOTING MODEL 47W70 DARNING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss troubleshooting of the Model 47W70 Darning Machine. He will discuss some of the most common malfunctions that will occur on the darning machine, find the possible causes, and make corrective remedies.

2. The instructions covered during this period will be of value to you as clothing and textile repairman, and sewing machine operator. The information you gain during this period will enable you to diagnose and correct a malfunction almost instantly. To be able to make these adjustments without loss of time indicates the mark of a good operator.

B. Objective

As a result of this instruction, the student, given appropriate references, tools, supplies, troubleshooting chart, and model 47W70 darning machine with eight malfunctions as outlined in troubleshooting chart, will be able to detect and correct all previously established malfunctions.

II. Presentation

A. During this period the instructor will provide you with information useful in diagnosing andcorrecting unsatisfactory operation of the model 47W70 darning machine.

1. Needle thread breaks

Causes and remedy of needle thread breakage:

a. Needle thread tension is too tight - adjust thread tension.

b. Thread is too heavy for needle - use correct size thread for needle.

c. Right-twist thread is being used - use left-twist thread.

d. Thread is damp or defective - use dry, smooth thread.

e. Machine is incorrectly threaded - thread machine correctly.

f. Needle is incorrectly installed - install the needle properly.

g. Needle is bent or has blunt or dull point - install a serviceable needle.

h. Bobbin case, tension controller, and hook have sharp edges - report this condition to supervisor.

2. Needle Breakage

Causes and remedy of needle breakage:

a. Needle is loose - tighten needle.

b. Needle is wrong class, variety, or size - install correct needle.

c. Presser foot is loose - report this condition to supervisor.

3. Bobbin Thread Breakage

Causes and remedy of bobbin thread breakage:

a. Thread is damp or defective - use dry, smooth thread.

b. Bobbin tension is too great - adjust bobbin tension.

c. Bobbin case is incorrectly threaded - thread bobbin case correctly.

d. Bobbin is wound unevenly, too full to revolve freely, or too loose - reset bobbin winder to wind bobbin correctly and rewind bobbin.

e. Bobbin case is sticky with oil and lint - report this condition to your supervisor.

f. Bobbin, bobbin case, hook, and needle have sharp edges - report this condition to your supervisor.

4. Stitches skip or fail to lock.

Causes and remedy of skipped stitches or fails to lock:

a. Needle is incorrectly installed - install needle properly.

b. Needle fails to catch bobbin thread because sewing hook is out of adjustment - adjust sewing hook properly.

c. Needle bar is out of adjustment - adjust needle bar properly.

5. Seams draw or pucker

Causes and remedy of seam drawing or puckered:

a. Thread tension is too tight - adjust bobbin and needle thread tension.

b. Operator is feeding material at improper speed - feed material in relation to speed of machine.

6. Lamp does not light when switch in on ON position

Causes and remedy of light failure:

a. Light cord is not plugged into electrical power receptacle - plug cord into electrical power receptacle.

b. Light cord is broken - report this condition to your supervisor.

c. Incandescent lamp (bulb) is burned out - replace lamp.

d. Lamp assembly or switch is defective - report this condition to your supervisor.

e. Electrical power receptacle is defective -report this condition to your supervisor.

7. Motor fails to start when switch is in ON position

Causes and remedy when motor fails to start:

a. Power cable is not plugged into electrical power receptacle - plug power cable into power receptacle.

b. Power cable is broken - report this condition to your supervisor.

c. Switch is defective - report this condition to your supervisor.

d. Motor is defective - report this condition to your supervisor.

8. Unusual noise in motor.

Causes and remedy for unusual noises:

Motor is defective - shut down sewing machine and report this condition to your supervisor.

9. Motor does not pull the load

Causes and remedy if motor will not pull load:

a. Drive belt is slipping - report this condition to your supervisor.

b. Improper voltage or motor is faulty - report this condition to your supervisor.

B. Student Practical Exercise

1. The instructor will set up the following malfunctions on the darning machines:

   a. Machines improperly threaded.

   b. Wrong class of needle.

   c. Thread tension too tight.

   d. Thread of incorrect size.

   e. Needle installed in needle bar incorrectly.

   f. Bent needle.

   g. Cut off power source (For Safety).

   h. Thread tension too loose.

2. The students will not operate the machine nor will they turn the switch in the ON position. Machines will not be plugged into electrical power receptacles.

3. Each student will visually check his machine and make a list of the malfunctions, that he finds.

4. Instructors will supervise the practical exercise, make certain that students, do not operate or plug the machines into the electrical power receptacles. Instructor will also make certain that each student has opportunity to check a machine, and make a list of his findings.

5. Students will retain his list of findings, and use them during the critique of the hour, at which time they will be called upon to give a summary of their findings.

SECTION XXII

OPERATOR MAINTENANCE OF MODEL 246-5 OVEREDGING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this hour of instruction the instructor will discuss the importance of lubrication, operator's preventive maintenance services, and safety precautions to be observed while performing operator's maintenan on the model 246-5, overedging machine.

2. You will find the model 246-5 overedging machine is used for a special purpose and makes an unusual type of stitch in comparison to the machines already discussed. Regardless of the use of type and model of machine it will be necessary to perform the operator's preventive maintenance services. This service is necessary to prolong the life of the machine.

B. Objectives

As a result of this instruction, the student, given appropriate references, lubrication chart, detailed lubrication instructions, model 246-5 overedging machine, and appropriate tools and supplies, will be able to lubricate the model 246-5 overedging machine with prescribed lubricant according to the service intervals and points of application specified on the lubrication chart; given an operator's check list and safety standards, the student will be able to perform "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards.

II. Presentation

A. Preventive Maintenance Services

To insure that the model 246-5 overedging machine is ready for operation at all times, its components must be inspected systematically so that defects may be discovered and corrected before they result in serious failure or damage. Defects discovered during operation of the machine should be noted for future correction. Try to make corrections immediately, or if this is not possible, as soon as the operation of the machine has ceased. Stop operation immediately if a deficiency is noticed which, if continued, would damage the equipment. All deficiencies and the corrective action taken will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

1. The following preventive maintenance services should be performed daily on the overedge sewing machine (model 246-5).

a. Table Assembly

Inspect the table assembly for cut, cracked, broken, warped, or dirty tabletops; for loose or missing bolts and nuts, and for loose mounting to the folding stand. Make certain the table assembly is level.

b. Machine Head

Inspect the machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mountings. Inspect the needle for broken or excessively worn point, for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed.

c. Lamp Assembly

Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and for loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electric cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.

d. Thread Unwinder

Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.

e. Drive Belt and Pulleys

Inspect for broken, frayed, or excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, broken edges, and loose mounting. Check for ¼" finger-pressure depression midway between pulleys.

f. Electric Motor

Inspect the motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration during operation.

g. Folding Stand

Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor. (The folding stand is normally found on the clothing repair trailer).

h. Starting Treadle

Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine.

i. Motor Switch

Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switch box. Check the switch for improper operation and make certain it turns the motor on and off. NOTE: During operation observe for any unusual noise or vibration.

B. Lubrication of the Model 246-5 Overedge Machine.

1. Lubricants to be used.

a. L.O. Lubricating Oil, General Purpose.

b. GAA. Grease, Automotive and Artillery.

2. Machine to be lubricated at intervals based on normal eight-hour day of continuous operation. Reduce intervals for abnormal conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

3. Clean parts with solvent, drycleaning and dry, before lubricating.

4. Apply two or three drops of lubricating oil at each friction point unless otherwise noted.

5. Oil sight gage. Every four (4) hours check the oil sight gage and maintain the oil level at the midpoint of the gage. Drain oil reservoir once every one hundred (100) hours and refill with fresh oil. Drain oil by tilting machine.

6. Motor. Every 250 hours, lubricate oil point with two or

three drops of lubricating oil; turn grease cup clockwise three turns and fill as necessary.

7. A copy of lubrication order LO 10-3530-203-10-4 will remain with the equipment at all times; instructions contained therein are mandatory.

C. Safety Precautions

1. Keep fingers away from needle, loopers and knives at all times.

2. Turn off motor when performing operator preventive maintenance services.

D. Student Practical Exercise

1. Students will perform preventive maintenance services in accordance with maintenance check list.

2. Student will lubricate the model 246-5 overedge machine in accordance with Lubrication Order LO 10-3530-203-10-4.

3. Instructor will observe students practical exercise and give assistance when needed.

4. Students will ask questions when in doubt.

5. Instructor will enforce the safety precautions required to be taken by the student.

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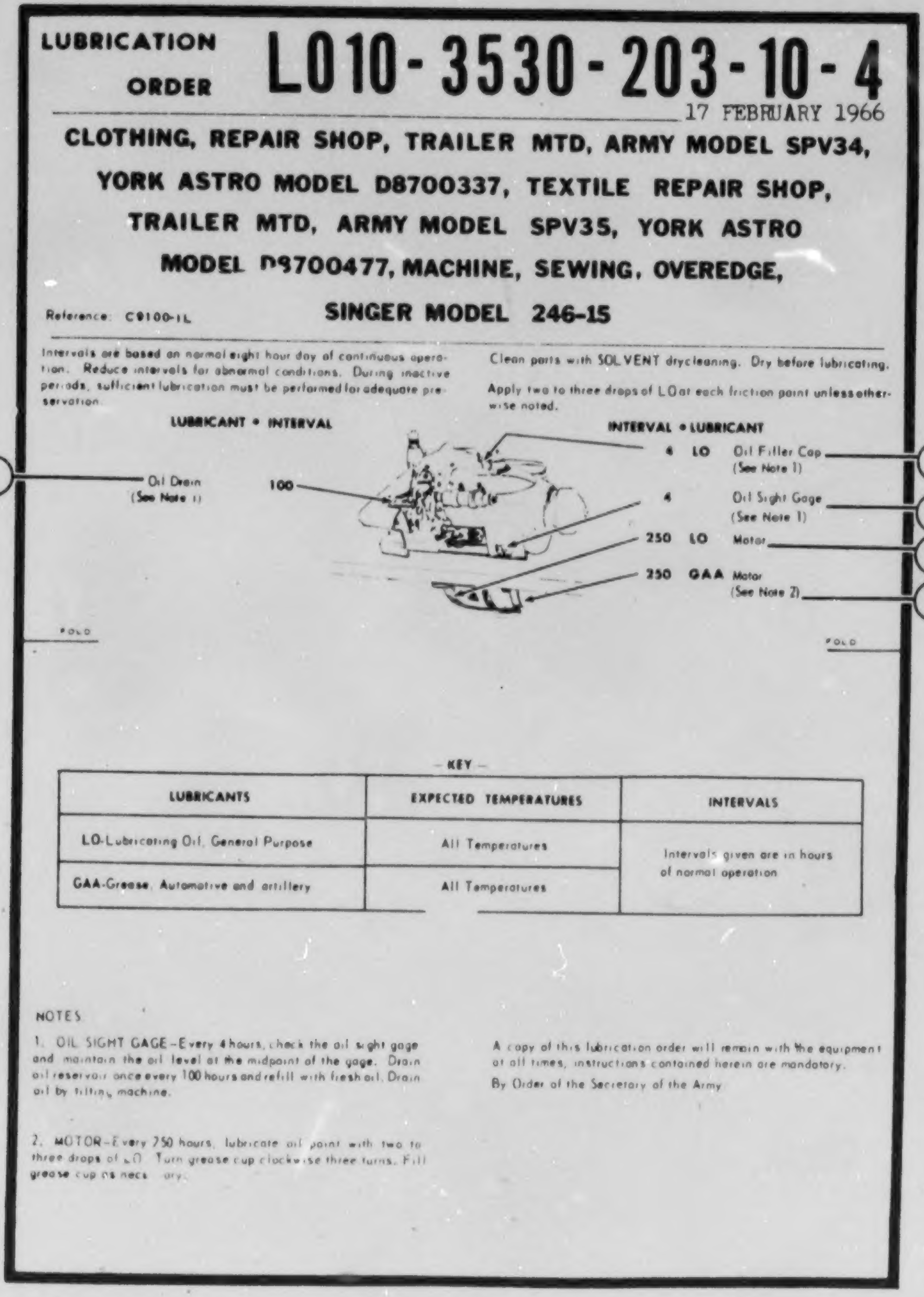


LUBRICATION ORDER **LO10-3530-203-10-4**

17 FEBRUARY 1966

CLOTHING, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV34, YORK ASTRO MODEL D8700337, TEXTILE REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV35, YORK ASTRO MODEL D8700477, MACHINE, SEWING, OVEREDGE, SINGER MODEL 246-15

Reference: C9100-IL

Intervals are based on normal eight hour day of continuous operation. Reduce intervals for abnormal conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean parts with SOLVENT drycleaning. Dry before lubricating.

Apply two to three drops of LO at each friction point unless otherwise noted.

LUBRICANT • INTERVAL

① Oil Drain (See Note 1) 100

INTERVAL • LUBRICANT

4 LO Oil Filler Cap (See Note 1) ②

4 Oil Sight Gage (See Note 1) ③

250 LO Motor ④

250 GAA Motor (See Note 2) ⑤

FOLD

FOLD

— KEY —

LUBRICANTS	EXPECTED TEMPERATURES	INTERVALS
LO-Lubricating Oil, General Purpose	All Temperatures	Intervals given are in hours of normal operation
GAA-Grease, Automotive and artillery	All Temperatures	

NOTES

1. OIL SIGHT GAGE–Every 4 hours, check the oil sight gage and maintain the oil level at the midpoint of the gage. Drain oil reservoir once every 100 hours and refill with fresh oil. Drain oil by tilting machine.

2. MOTOR–Every 250 hours, lubricate oil point with two to three drops of LO. Turn grease cup clockwise three turns. Fill grease cup as necessary.

A copy of this lubrication order will remain with the equipment at all times, instructions contained herein are mandatory.

By Order of the Secretary of the Army

Figure 49 - *Lubrication Order 10–3530–203–10–4 for overedge sewing machine.*

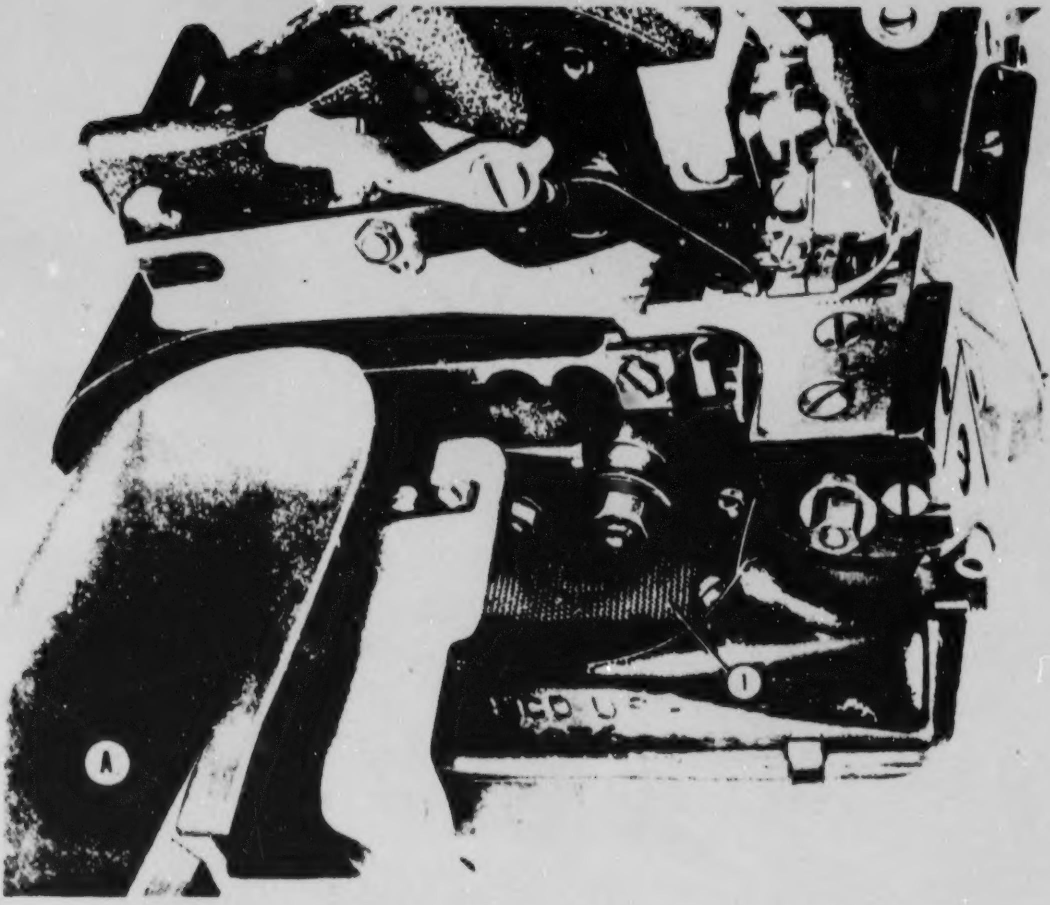
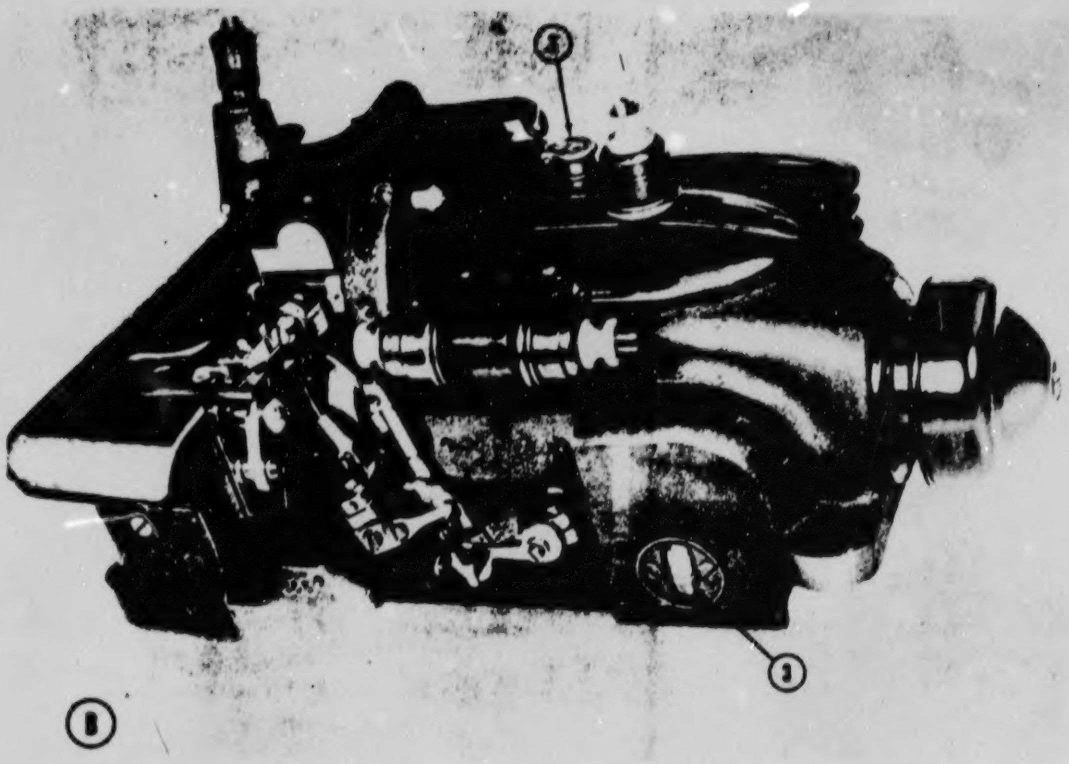


Figure 50 - *Lubrication points on overedge sewing machine.*



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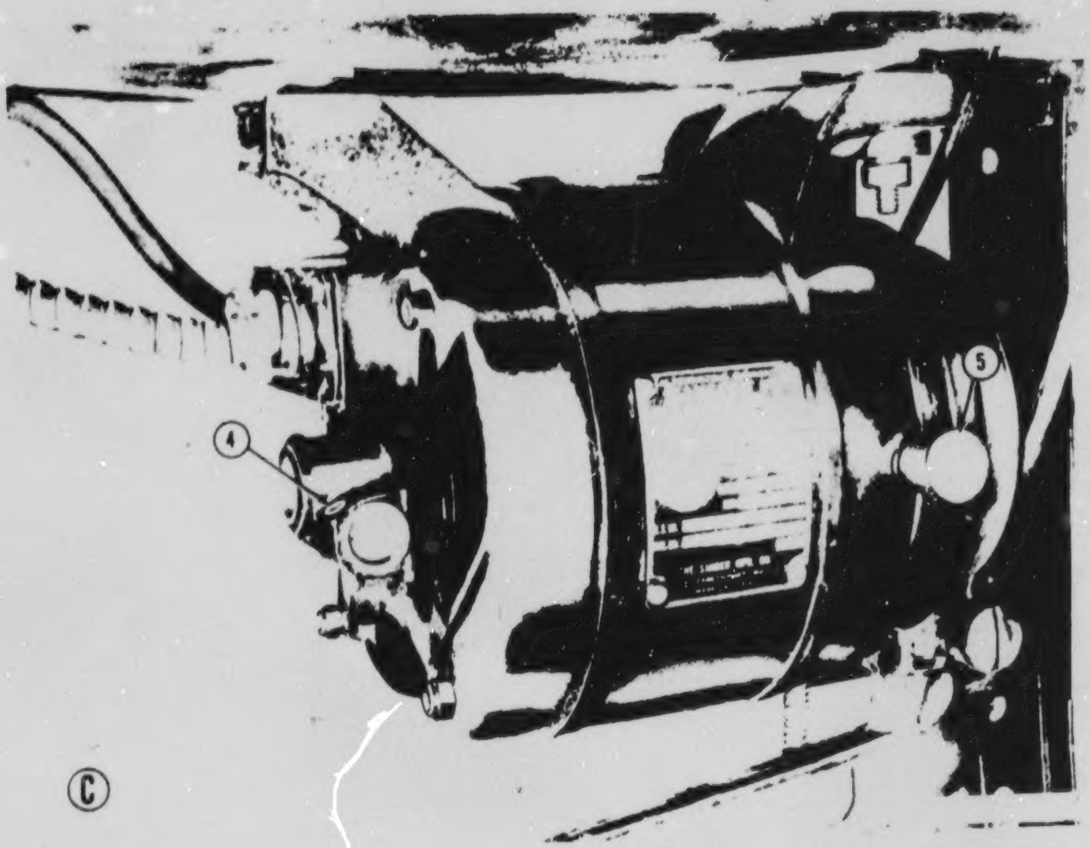

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Continued.

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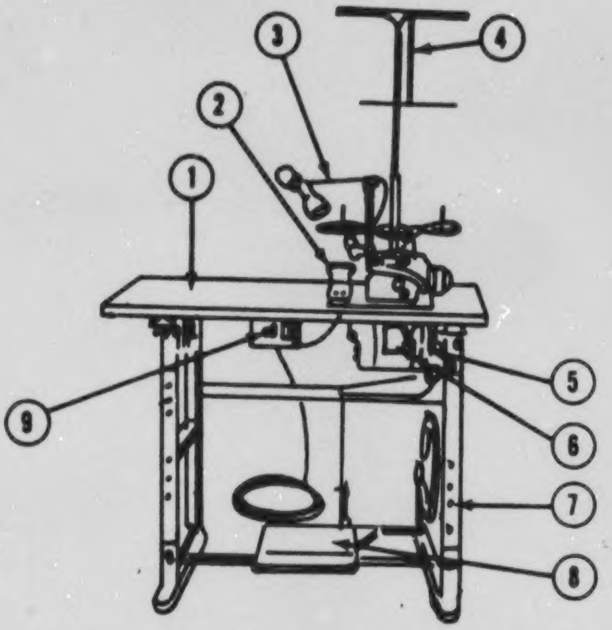
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 10-3530-203-10 MACHINE, SEWING, OVEREDGE



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level.	

Figure 51

ITEM		PAR REF
2	MACHINE HEAD. Inspect the machine head for dirty surfaces and grease deposits; for bent, broken, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point, for bent or broken shaft; and for loose mounting. Make certain the needle is properly installed.	
3	LAMP ASSEMBLY. Inspect the lamp assembly and bracket for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
4	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; and for loose mounting.	
5	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and loose mounting. Check for 1/4-inch finger-pressure deflection midway between pulleys.	
6	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	
7	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
8	STARTING TREADLE. Inspect the starting treadle for bent, broken, loose, or missing components. Press the treadle and make certain it engages the motor with the machine.	

Continued.

ITEM		PAR REF
9	**MOTOR SWITCH.** Inspect for bent or broken motor switch. Inspect the switch for loose mounting in the switchbox. Check the switch for improper operation; make certain it turns the motor on and off. **NOTE 1. OPERATION.** During operation observe for any unusual noise or vibration.	

— Continued.

SECTION XXIII

PREPARATION FOR OPERATION MODEL 246-5 OVEREDGING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the preparation for operation the model 246-5 overedging machine. Instructions will include installing the needle and threading the machine.

B. As a result of this instruction, the student given appropriate references, unthreaded model 246-5 overedging machine, threading charts, appropriate needles, tools and supplies will be able to prepare model 246-5 overedging machine for operation by installing needle in needle bar, and threading the machine in accordance with threading chart.

II. Presentation

A. Selecting Needle

Select the needle of the correct size (16 or 18) according to the type of left-twist thread and weight of material to be used for sewing on the overedge sewing machine. The thread must pass freely through the eye of the needle. Rough or uneven thread or thread which for any reason does not slip easily through the eye of the needle interferes with the operation of the machine. The class number (151) and the variety number (1) are expressed by placing the letter X between the two numbers; for example, 151X1 needles. The class number describes the shark of the needle, and the variety number describes the length of the needle and the type of point, and the size describes the gage and the eye of the needle.

B. Installing Needle

Use a good needle (never a bent one or one with a dull or a blunt point) of a suitable size for the material. Turn the machine drive shaft pulley toward the front of the machine until the needle drive shaft is at its highest point. Raise the presser bar opening lever to disengage the swing-out presser bar and swing the presser bar to the left. Loosen the clamping nut at the lower end of the needle drive shaft and remove the needle. Install the needle through the needle clamp and needle holder as far as it will go against the needle stop pin. Tighten the clamping nut securely.

C. Threading Unwinder, Needle, and Loopers

Refer to paragraph VI, A of Practical Exercise for the proper threading procedures to be followed.

D. Due to the construction of thread guide tubes it will be necessary to use a threading wire to thread the model 246-5 overedging machine.

PREPARATION FOR OPERATION MODEL 246-5 OVEREDGING MACHINE

PRACTICAL EXERCISE

I. Introduction

The purpose of this practical exercise is to enable the student to learn and apply the proper procedures to prepare for operation the model 246-5 overedging machine.

II. Study Reference

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Clothing Repair Shop, Section III, paragraph 32, pages 46-48, 49-52.

III. Supplies and Tools Required

Model 246-5 Overedging Machine

Thread - (3 cones per machine)

Threading wire - (1 per machine)

Rags (cleaning) - (ample supply)

IV. Direction to students

This practical exercise will be performed by the student following the step procedures as outlined in paragraph VI, B. When in doubt the student will call on the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance through observation and inspection of the final results.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Proper use of tools (screwdriver, threading wire).

2. Needle of the correct size and variety.
3. Machine needle properly installed.
4. Machine threaded properly (thread proper size).
5. Machine is free of dirt, lint, and properly lubricated.

B. The step procedures listed to the left of the page in the breakdown below will be followed in the order given. The key points, which correspond in number to the procedure for each breakdown, are listed to the right of the page.

Threading the Machine.

1. Threading the unwinder.	1. a. Pass needle thread from cone from back to front, through loop. b. Down and from top to bottom, through eyelet, and from top to bottom through second eyelet. c. Pass left looper thread from cone over from right to left through looper. d. Down and from top to bottom through eyelet, and from top to bottom, through second eyelet. e. Pass right looper thread from cone, over from back to front, through loop. f. Down from top to bottom through eyelet and from top to bottom through second eyelet.
2. Threading the needle.	2. a. Pass needle thread from back to front, through needle thread tension guide, behind tension discs. b. Pass thread clockwise between tension discs. c. Revolve drive shaft pulley away from operator until needle reaches its highest position. d. Then, using threading wire, guide thread from right to left through thread tube.

	e. Remove thread from threading wire and pass thread up, from right to left, through eyelet. f. Pass thread down and from front to back, through needle eye. g. Pull approximately two (2) inches of thread through needle eye.
3. Threading the right looper.	3. a. Turn drive shaft pulley away from operator until needle is at its lowest point. b. Guide right looper thread from back to front, through tension thread eyelet, and under thread guide. c. Pass thread between the tension discs. d. With looper thread plate cover open, pass thread down through stationary eyelet. e. Pass thread from right to left, through adjustable eyelet, and from right to left between right take up, and its wire guard, then from right to left through rear eye in left take up. f. Using the threading wire, guide thread into right looper thread tube opening. g. Draw thread out of tube exit and pass thread from front to back, through eye of right looper. h. Draw about 2 inches of thread through right looper.
4. Threading the left looper.	4. a. From the unwinder, guide left looper thread from back to front, through tension thread eyelet, and down under thread guide. b. Then over and between tension discs. c. With looper thread plate cover open, pass thread through movable eyelet, and from right to left between right take up and its wire guard. d. Run thread from right to left, through front eyelet on left take-up, and from right to

left through eyelet in right take-up.

e. Using the threading wire, guide thread from right to left through tube and up groove.

f. Revolve drive shaft pulley away from operator enough to place eye of left looper directly in line with tube.

g. Pass thread from front to back through tube, and through eye of left looper.

h. Draw about 2 inches of thread through looper eye.

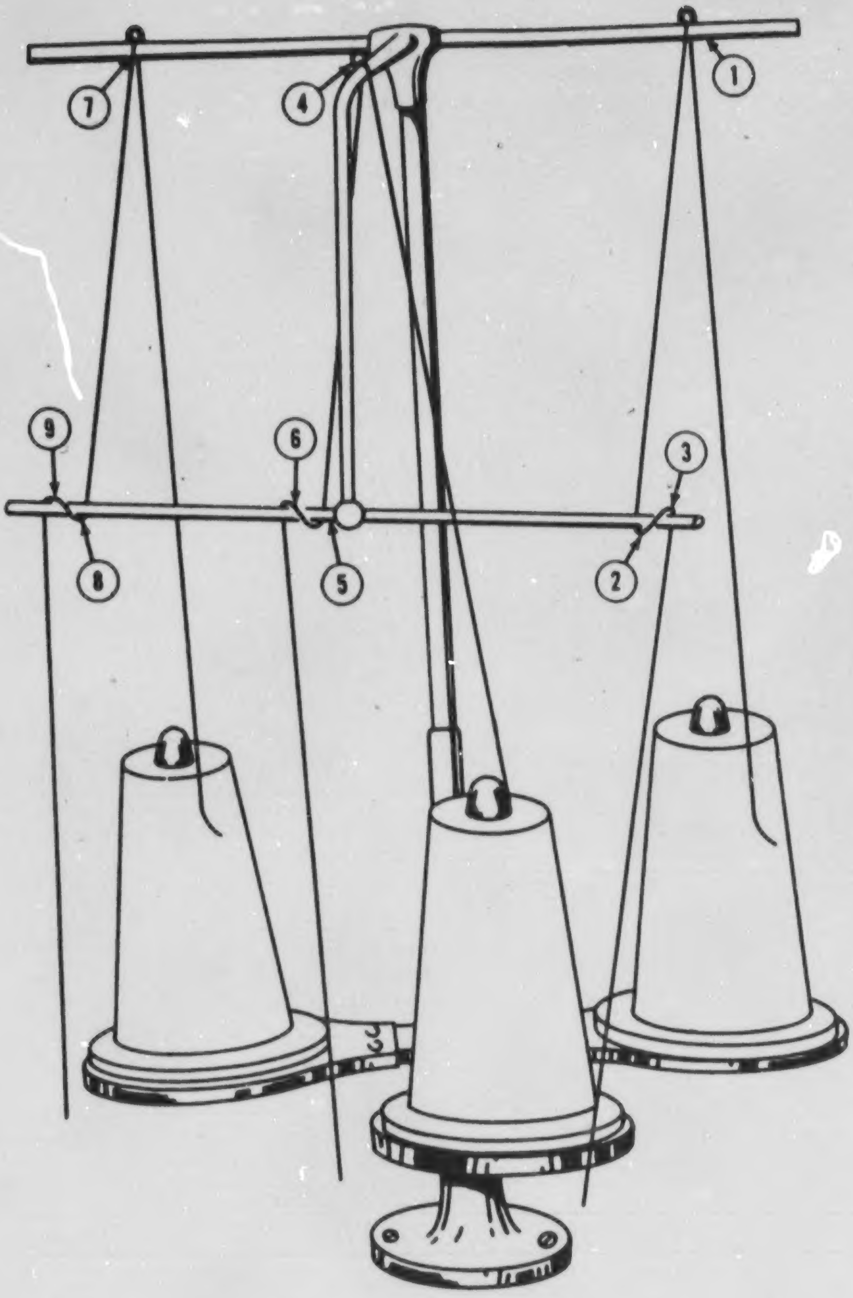


Figure 52 - *Threading sequence for unwinder (overedge sewing machine).*

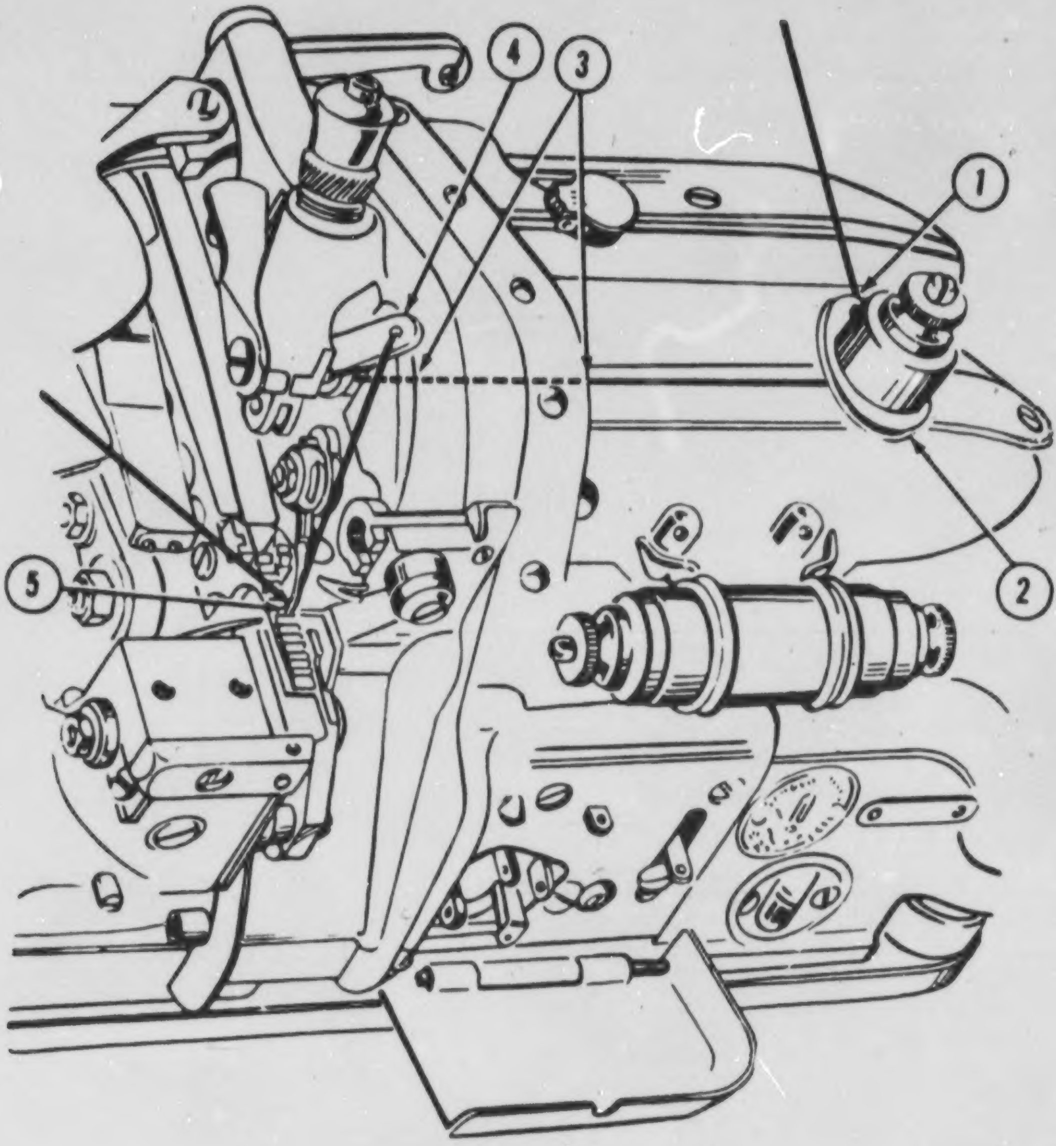


Figure 53 - *Threading sequence for overedge sewing machine.*

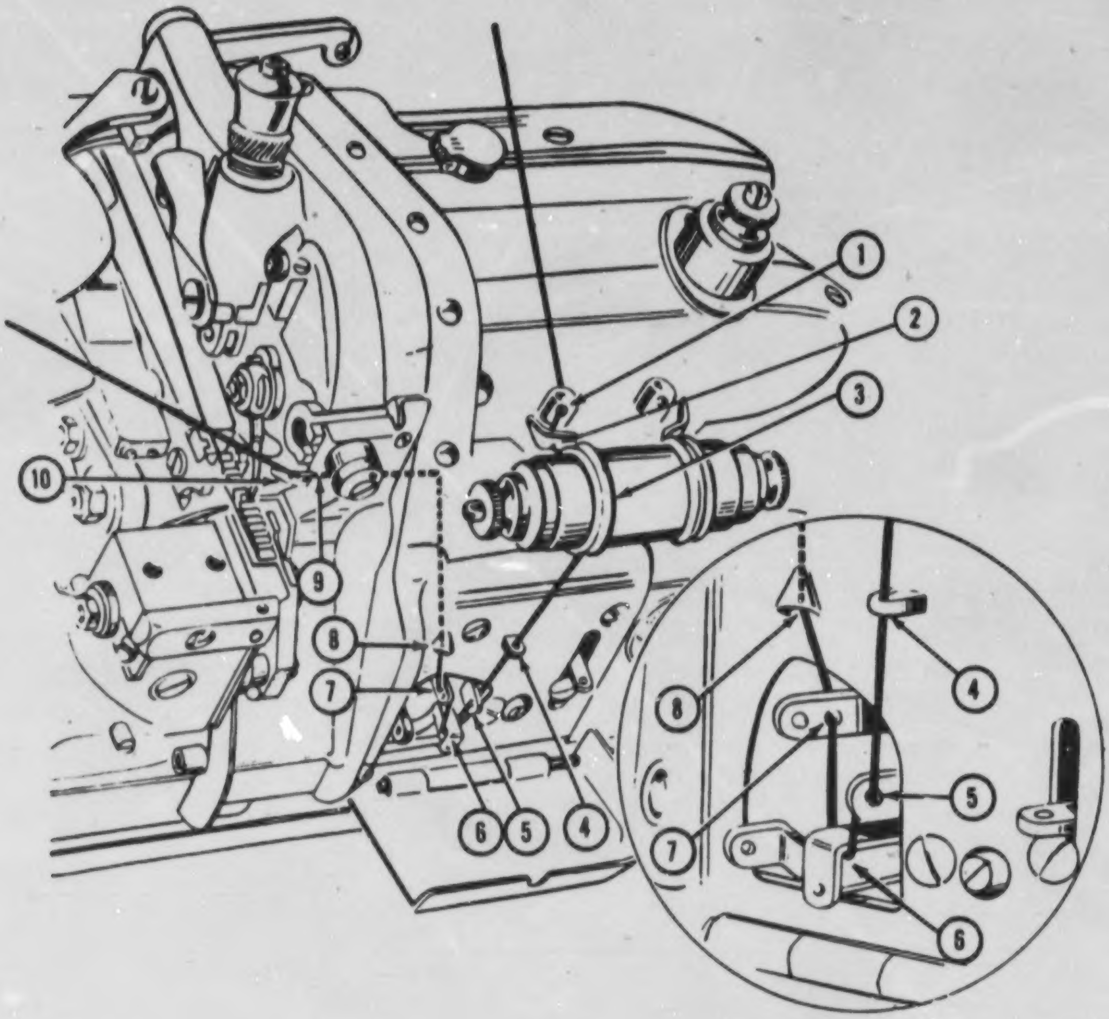

1
2
3
10
9
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Figure 54 - *Threading sequence for right looper (overedge sewing machine).*

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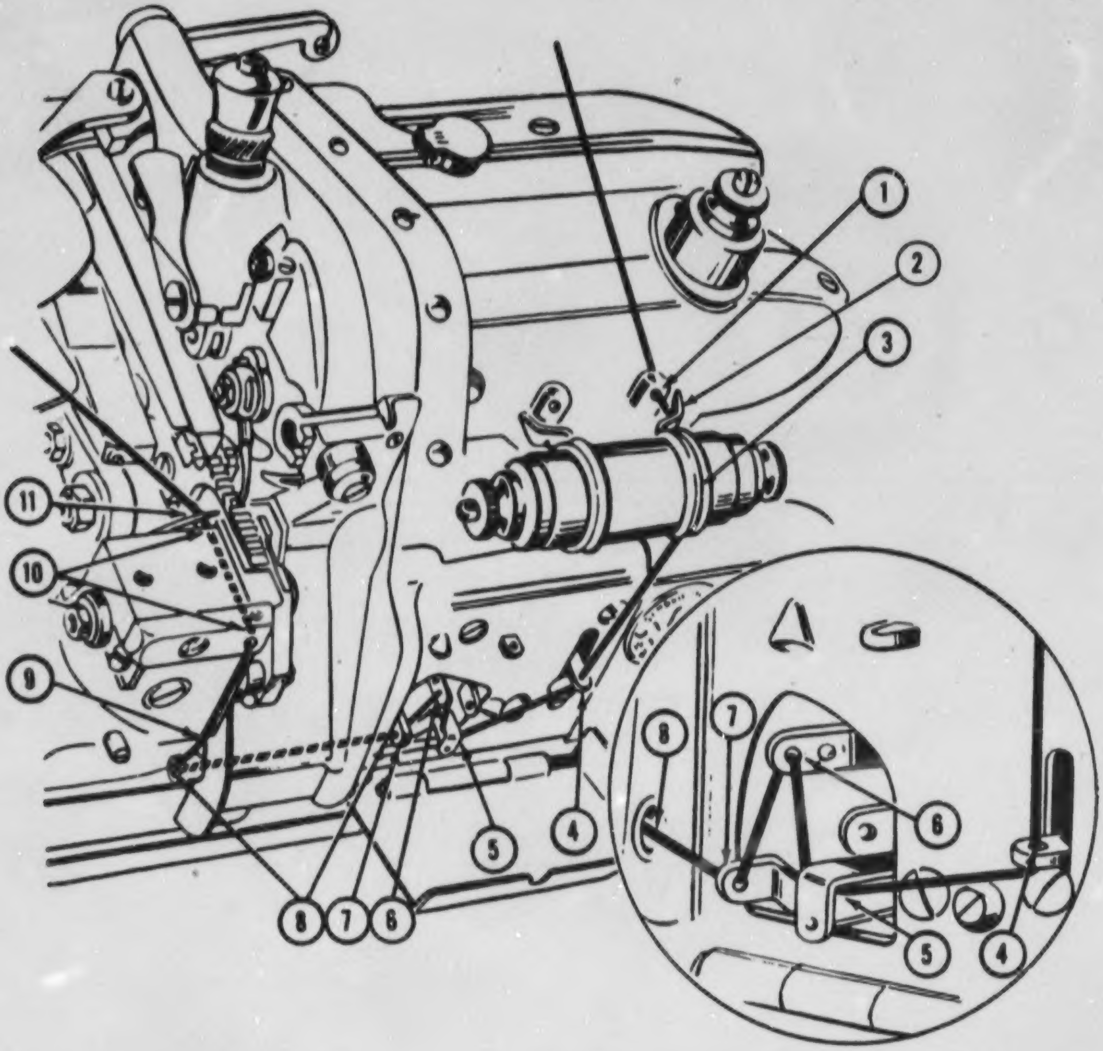

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8
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6
5
4

Figure 55 - *Threading sequence for left looper (overedge sewing machine).*

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SECTION XXIV

ADJUSTMENT AND OPERATION OF MODEL 246-5 OVEREDGING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the adjustment and operation of the model 246-5 overedging machine. This information is of importance to you as a sewing machine operator. Your ability to make the proper adjustments when required will improve your efficiency as a machine operator.

B. Objective

As a result of this instruction, the student, given model 246-5 overedging machine that he previously prepared for operation, appropriate tools, supplies, references, timing and adjustment measurements, and deviation standards, will be able to adjust the motor clutch pedal to achieve the correct starting and braking action of machine; given operation instructions on inserting and removing work, safety precautions in operation, thread tension charts, appropriate references and various pieces of material of various thicknesses (one thickness at a time), stitch and make adjustments to presserfoot in accordance to the thickness of material inserted, adjust looper and needle threads in accordance with tension charts, determine the need for adjusting and/or replacing the trimming knives, observe all safety precautions in operating and making adjustments, perform "during operation" preventive maintenance services in accordance with lubrication charts and operator's PM check list, remove work from machine to the satisfaction of the instructor, and perform "after operation" preventive maintenance services according to operator's PM check list and TM 10-3530-203-10.

II. Presentation

A. Adjustment of the Motor Clutch Pedal.

1. The clutch which connects the machine driving pulley of the motor to the machine pulley, is operated by a foot treadle.

2. The clutch will be adjusted in the same manner as the clutch of the model 31-15 sewing machine and the model 47W70 darning machine.

B. Inserting and removing work.

1. When inserting material in machine, depress the knee lifter to left the presser foot. Place the material on the feed dog beneath the presser foot, and sufficiently to the right of the needle to permit the knives to trim the edge of the material. The bulk of the material will be to the operator's left. Release the knee lifter. The cloth will now be held firmly between the presser foot and the feed dog.

2. If both trimming and overedging are required, place the edge of the material sufficiently to the right so that it extends past the knives. The width of the strip to be trimmed can be varied by moving the edge of the material closer to or farther beyond the cutting point.

3. In feeding use the flat side of the knives as a guide.

4. When removing material from the machine, chain off of the material six (6) inches or more and then cut the thread.

C. Safety Precautions.

1. While making adjustments, the operator must be careful to cut off the motor switch, or remove the driving belt before he removes needles

or makes any adjustments requiring the use of tools.

2. While operating the machine, the operator must, at all times, be careful to keep his fingers away from the needle.

D. Determining the need for adjusting and/or replacing the trimming knives.

1. To determine the need for adjusting and/or replacement of the trimming knives, you must feed a piece of material into the machine, if the knives will trim the material sharp and clean, and the material does not hang or ball up under the knives, then the knives are OK.

2. If the material is not cut clean and straight, and the material terds to hand up at the knives, then you will have to notify the unit mechanic, as you are not authorized to make this adjustment, and the machine will not operate effectively with dull or unadjusted knives.

E. Adjusting pressure on presser foot.

1. To adjust the pressure on the pressure foot and the material with the pressure regulating thumbscrew, turn the thumbscrew clockwise (downward) to increase the pressure and turn it counterclockwise (upward) to decrease.

2. If there is not enough pressure on the presser foot, the material will not feed through the machine as it should, if there is too much pressure on the presser foot, the feed dog will cut the material.

F. Adjusting thread tensions.

1. The model 246-5 overedging machine has three (3) threads, a needle thread, a left looper thread, and a right looper thread, for this reason you will find three (3) tension assemblies.

2. To adjust the thread tension you must sew with the machine and check the stitching. The needle thread should be on the top of the material,

the right looper thread should be on the edge of the material and the left looper thread should be on the bottom of the material. The needle thread and the left looper thread should be on the bottom of the material. The needle thread and the left looper thread should be locked with the right looper thread on the edge of the material. Therefore, most of the tension should be applied to the needle thread and the least amount of tension should be on the right looper thread.

3. To change the tension, turn the tension regulating thumbnut to the right (clockwise) to increase the tension, and to the left (counter-clockwise) to decrease the tension.

G. The instructor will go over the "before", "during", and "after" operator's preventive maintenance services in accordance with the operator's check list and safety precautions (Daily Preventive Maintenance Service).

1. "Before" operation services.

   Before beginning to operate the machine the operator should:

   a. Examine the drive belt and controls.

   b. Inspect the entire machine for damage.

   c. Insure that the sewing lamp is functional.

   d. Test the machine for adjustment.

   e. Lubricate machine, if needed.

2. "During" operation services.

   While operating the machine the operator should:

   a. Lubricate the machine, as needed.

   b. Clean dust, grit, or lint out of the machine.

   c. Make adjustments required by the nature of the fabric being sewn.

d. Replace broken needles and keep the presser foot tight.

3. "After" operation services.

Before leaving the machine after a day's run, the operator should:

a. Clean dirt, lint, and grit out of all moving parts.

b. Lubricate the machine as needed.

c. Leave test patch under the presser foot (to indicate the machine will operate).

d. Turn off motor.

ADJUSTMENT AND OPERATION OF MODEL 246-5 OVEREDGING MACHINE

PRACTICAL EXERCISE

I. Introduction

The purpose of this practical exercise is to enable the student to become familiar with the adjustment and operation of the model 246-5 overedging machine.

II. Reference

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Clothing Repair Shop, Section III, par 33, page 48.

III. Supplies and Tools Required

Model 246-5 overedging machine

Screwdriver - (1 per machine)

Wrench - (1 per machine)

Testing material (ample supply)

Rags (cleaning) (ample supply)

IV. Direction to the Students

1. Student will perform the practical exercise following the procedures outlined in the preceeding pages.

2. Student will observe all of the safety precautions during the practical exercise.

3. When in doubt, the student will call on the instructor for assistance.

SECTION XXV

TROUBLESHOOTING MODEL 246-5 OVEREDGING MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this hour, the instructor will discuss troubleshooting model 246-5 overedging machine. At this point of your training, you must be aware of the importance of this subject. This is an area which cannot be overemphasized. The care that the sewing machines receive is dependent on you as an operator.

B. Objective

As a result of this instruction, the student, given appropriate references, tools, supplies, troubleshooting chart, and model 246-5 overedging machine with eight malfunctions as outlined in troubleshooting chart, will be able to detect and correct all previously established malfunctions.

II. Presentation

A. Detection and correction of malfunctions of the model 246-5 overedging machine.

1. Needle thread breaks (causes and remedy).

a. Needle thread tension is too tight - adjust thread tension.

b. Thread too heavy for needle - use correct size thread for needle.

c. Right twist thread being used - use left twist thread.

d. Thread is damp or defective - use dry smooth thread.

e. Machine is incorrectly threaded - thread machine correctly.

f. Needle is incorrectly installed - install the needle properly.

g. Needle is bent or has a dull or blunt point - install a serviceable needle.

2. Needle breaks.

a. Needle loose in clamp - tighten needle.

b. Needle too large - use proper size needle.

c. Presser foot loose or out of adjustment - adjust presser foot.

d. Needle bent - install a serviceable needle.

e. Needle deflecting loopers - report this condition to your supervisor.

3. Stitches skip or fail to lock.

a. Needle is incorrectly installed - install needle properly.

b. Needle bar is out of adjustment - report this condition to your supervisor.

4. Stitch does not chain.

Improper threading or threads broken - check for proper threading.

5. Stitch is too tight.

Left looper tension too great - adjust tension.

6. Stitch is too loose.

Loose tensions - adjust tension.

7. Seams draw.

a. Thread tension is too tight - adjust tension.

b. Operator is feeding material at improper speed - Feed material in relation to speed of machine.

8. Imperfect trimming.

Knives dull or out of adjustment - report this condition to your supervisor.

9. Machine runs hard.

Knife contact too great - report this condition to your supervisor.

10. Cloth does not feed.

a. Not enough pressure on presser foot - increase pressure.

b. Feed dogs too low - report this condition to your supervisor.

11. Feed Dogs strike throat plate.

Feed dogs out of adjustment - report this condition to your supervisor.

12. Lamp does not light when switch is in ON position.

a. Light cord is not plugged into the electrical power receptacle - plug cord into the electrical power receptacle.

b. Light cord is broken - report this condition to your supervisor.

c. Incandescent lamp (bulb) is burned out - replace lamp.

d. Lamp assembly or switch is defective - report this condition to your supervisor.

e. Electrical power receptacle is defective - report this condition to your supervisor.

13. Motor does not start when switch is in ON position.

a. Power cable is not plugged into electrical power receptacle - plug power cable into power receptacle.

b. Power cable is broken - report this condition to your supervisor.

c. Switch is defective - report this condition to your supervisor.

d. Motor is defective - report this condition to your supervisor.

14. Unusual noise in motor.

Motor is defective - shut down sewing machine and report this condition to your supervisor.

15. Motor does not pull load.

a. Drive belt is slipping - adjust drive belt.

b. Improper voltage or motor is faulty - report this condition to your supervisor.

16. Machine Pulley turns toward operator.

Improper rotation of motor - report this condition to your supervisor.

17. Machine does not turn.

Loose or broken drive belt or defective motor - report this condition to your supervisor.

B. Student practical exercise.

1. The instructor will set-up the following malfunctions on the model 246-5 overedging machines.

a. Machines improperly threaded.

b. Needle slightly out of line.

c. Thread tension too tight or loose.

d. One cone of thread of incorrect size.

e. Knives out of adjustment.

f. Cut off power source (for safety).

g. Remove drive belt from pulley.

2. The students will not operate the machines nor will they turn the switch in the ON position. Machines will not be plugged into the electrical power receptacles.

3. Each student will visually check his machine and make a list of the malfunctions, found on his machine.

4. Instructors will supervise the practical exercise, making certain that the students do not operate or plug the machines into the electrical power receptacles. Instructor will also make certain that each student has an opportunity to check out a machine and makes a list of his findings.

5. Students will retain his list of findings and use them during the critique of the hour, at which time they will be called upon to give a summary of their findings.

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SECTION XXVI

OPERATOR MAINTENANCE OF MODEL 175-60/61 BUTTON MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this hour of instruction, the instructor will discuss operators' maintenance of model 175-60/61 button machine. The instructor will again cover the importance of lubrication, operator's preventive maintenance services, and safety precautions to be observed.

B. Objective

As a result of this instruction, the student, given appropriate references, lubrication chart, detailed lubrication instructions, model 175-60/61 button machine, and appropriate tools and supplies, will be able to lubricate the model 175-60/61 button machine with prescribed lubricant according to the service intervals and points of application specified on the lubrication chart; given an operator's check list and safety standards, the student will be able to perform "before, during, and after" preventive maintenance services in accordance with the operator's check list and safety standards.

II. Presentation

A. Preventive Maintenance Services. To insure that the Model 175-60/61 Button Machine is ready for operation at all times; its components must be inspected systematically so that defects may be discovered and corrected before they result in failure or serious damage. Defects discovered during operation of the machine, should be noted for future correction. Try to make corrections immediately, or if this not possible, as soon as the operation of the machine has ceased. Stop operation immediately if a deficiency is noticed. Continued operation would damage the equipment. All deficiencies and corrective action taken will be recorded on DA Form 2404, "Equipment Inspection and Maintenance Worksheet," at the earliest possible opportunity.

The following preventive maintenance services should be performed daily on the Model 175-60/61 Button Machine.

a. Table Assembly. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.

b. Drive Belt Guard. Inspect the drive belt guard for bends, dirty surface, loose or missing screws, and for loose mounting.

c. Drive Belt and Pulleys. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped, or broken edges, and for loose mounting. Check for a 1-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.

d. Button Machine Head. Inspect the button machine head for dirty surfaces and grease deposits; for bent, broken, loose, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting.

e. Thread Unwinder. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; for corroded surfaces; and for loose mounting.

f. Lamp Assembly. Inspect the lamp assembly, bracket, and stand for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.

g. Folding Stand. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.

h. Starting Treadle. Inspect the starting treadle for bent, broken, loose, or missing components, and loose mounting. Press the treadle and make certain that the pulley shifter engages with the machine drive pulley.

i. Button Clamp Lifter Treadle. Inspect the button clamp lifter treadle for bent, broken, loose, or missing components, and for loose mounting. Press the treadle to make certain that the lifting rod raises and lowers the button clamp.

j. Electric Motor. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration during operation.

k. Motor Switch. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off.

B. Lubrication of the Model 175-60/61 Button Machine.

1. Lubricants to be used:

   a. LO-Lubricating Oil, general purpose.

   b. GAA-Grease, Automotive and Artillery.

2. Machine to be lubricated at intervals based on normal eight-hour day of continuous operation. Reduce abnormal conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

3. Clean parts with drycleaning solvent and dry before lubricating.

4. Apply two or three drops of lubricating oil at each friction point unless otherwise noted.

5. Motor. Every 250 hours, lubricate oil points with two or three drops of lubricating oil. Turn grease cup clockwise three turns and fill as necessary.

6. A copy of lubrication order LO 10-3530-203-10-1 will remain with the machine at all times, instructions contained therein are mandatory.

C. Safety Precautions.

1. Keep fingers away from needle during operation.

2. Turn off motor when performing operator preventive maintenance services.

3. During operation make certain the drive belt guard is in position and secure.

D. Student Practical Exercise.

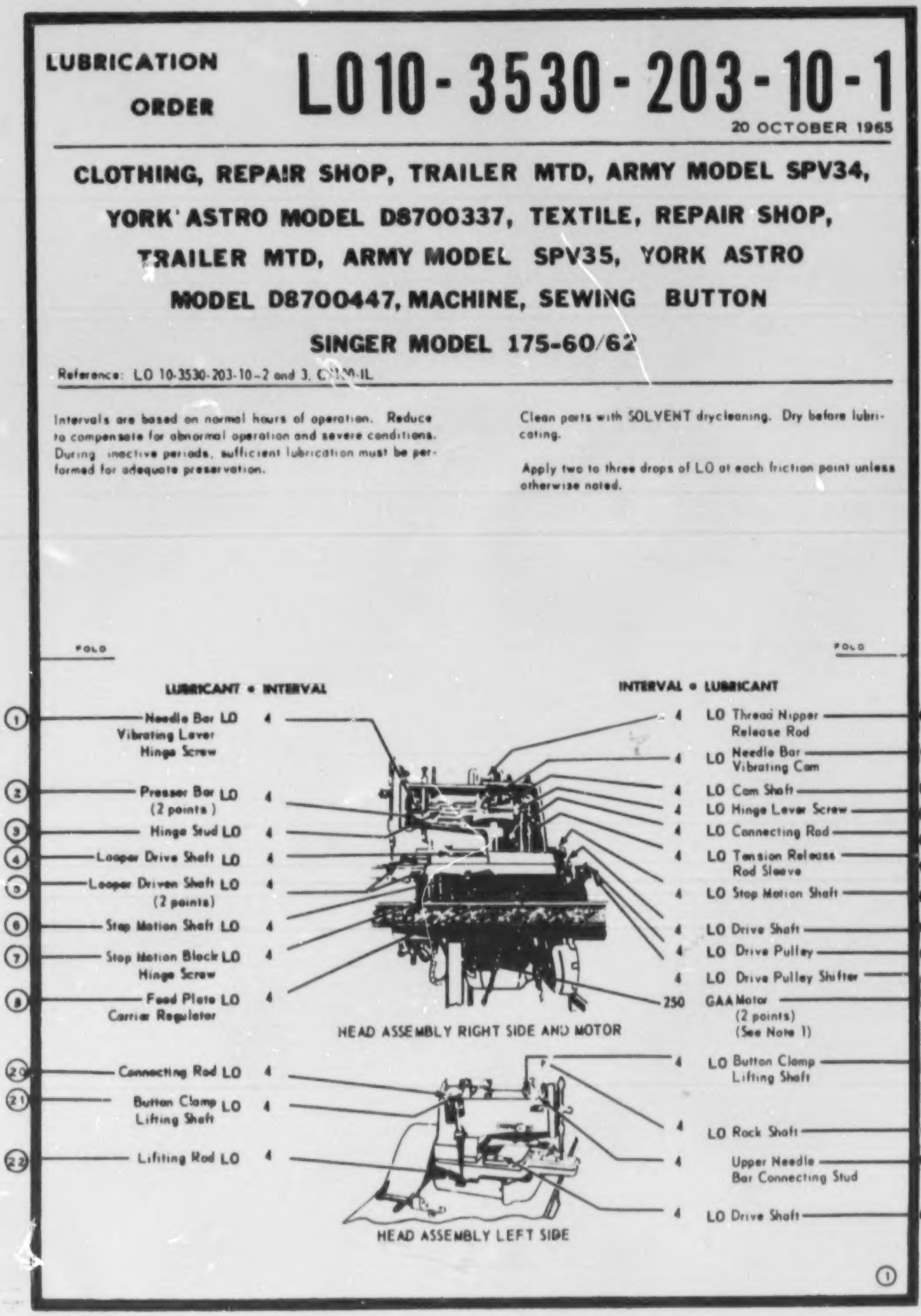
1. Students will perform operator's preventive maintenance in accordance with maintenance check list.

2. Student will lubricate the model 175-60/61 in accordance with LO 10-3530-203-10-1.

3. Instructor will observe student's practical exercise and give assistance when needed.

4. Students will ask questions when in doubt.

5. Instructor will enforce the safety precautions required to be taken by the instructor.



LUBRICATION ORDER **L010-3530-203-10-1**

20 OCTOBER 1965

CLOTHING, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV34, YORK ASTRO MODEL D8700337, TEXTILE, REPAIR SHOP, TRAILER MTD, ARMY MODEL SPV35, YORK ASTRO MODEL D8700447, MACHINE, SEWING BUTTON SINGER MODEL 175-60/62

Reference: LO 10-3530-203-10-2 and 3, C9100-IL

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean parts with SOLVENT drycleaning. Dry before lubricating.

Apply two to three drops of LO at each friction point unless otherwise noted.

FOLD

FOLD

		LUBRICANT	INTERVAL
①	Needle Bar Vibrating Lever Hinge Screw	LO	4
②	Presser Bar (2 points)	LO	4
③	Hinge Stud	LO	4
④	Looper Drive Shaft	LO	4
⑤	Looper Driven Shaft (2 points)	LO	4
⑥	Stop Motion Shaft	LO	4
⑦	Stop Motion Block Hinge Screw	LO	4
⑧	Feed Plate Carrier Regulator	LO	4
⑳	Connecting Rod	LO	4
㉑	Button Clamp Lifting Shaft	LO	4
㉒	Lifiting Rod	LO	4

INTERVAL	LUBRICANT		
4	LO	Thread Nipper Release Rod	⑨
4	LO	Needle Bar Vibrating Cam	⑩
4	LO	Cam Shaft	⑪
4	LO	Hinge Lever Screw	⑫
4	LO	Connecting Rod	⑬
4	LO	Tension Release Rod Sleeve	⑭
4	LO	Stop Motion Shaft	⑮
4	LO	Drive Shaft	⑯
4	LO	Drive Pulley	⑰
4	LO	Drive Pulley Shifter	⑱
250	GAA	Motor (2 points) (See Note 1)	⑲
4	LO	Button Clamp Lifting Shaft	㉓
4	LO	Rock Shaft	㉔
4		Upper Needle Bar Connecting Stud	㉕
4	LO	Drive Shaft	㉖

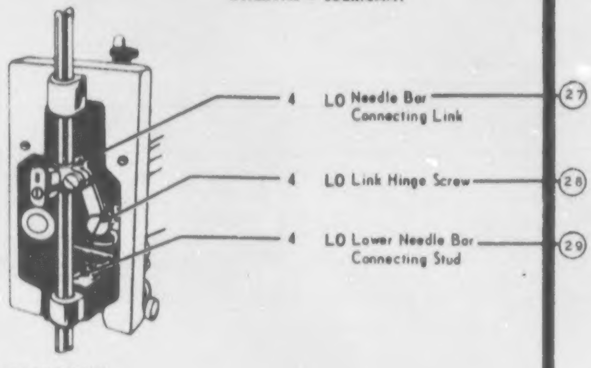
HEAD ASSEMBLY RIGHT SIDE AND MOTOR

HEAD ASSEMBLY LEFT SIDE

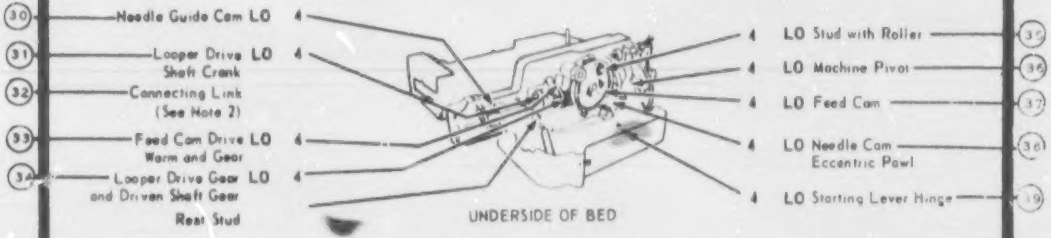
①

Figure 56 - *Lubrication Order 10-3530-203-10-1 for button sewing machine.*

LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**


4 LO Needle Bar Connecting Link ㉗
4 LO Link Hinge Screw ㉘
4 LO Lower Needle Bar Connecting Stud ㉙

FACE DETAIL


㉚ Needle Guide Cam LO 4
㉛ Looper Drive Shaft Crank LO 4
㉜ Connecting Link (See Note 2)
㉝ Feed Cam Drive Worm and Gear LO 4
㉞ Looper Drive Gear and Driven Shaft Gear LO 4
Rear Stud
4 LO Stud with Roller ㉟
4 LO Machine Pivot ㊱
4 LO Feed Cam ㊲
4 LO Needle Cam Eccentric Pawl ㊳
4 LO Starting Lever Hinge ㊴

UNDERSIDE OF BED

FOLD FOLD

– KEY –

LUBRICANTS	EXPECTED TEMPERATURES	INTERVALS
LO- Lubricating Oil, General Purpose	all temperatures	Intervals given are in hours of normal operation.
GAA- Grease, Automotive and Artillery	all temperatures	

NOTES

1. MOTOR. Lubricate oil points with two or three drops of LO every 4 hours. Fill grease cups as necessary with GAA grease. Turn grease cups clockwise three turns every 250 hours.

2. LOOPER DRIVE SHAFT CRANK CONNECTING LINK. Handturn machine through portion of sewing cycle to gain access to opposite point.

A copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

Figure 56 — Continued.

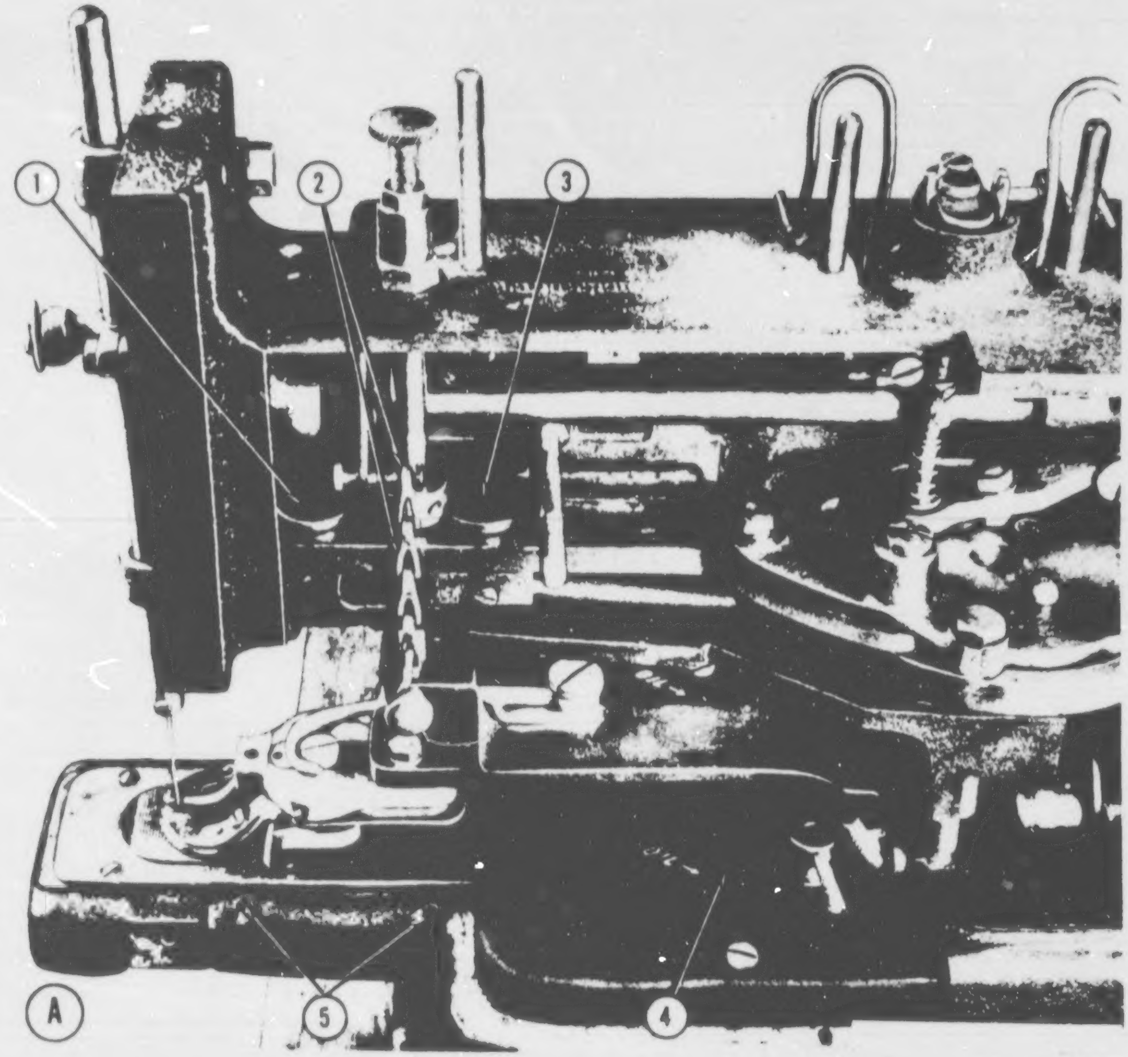


Figure 57 - *Lubrication points on button sewing machine.*

306

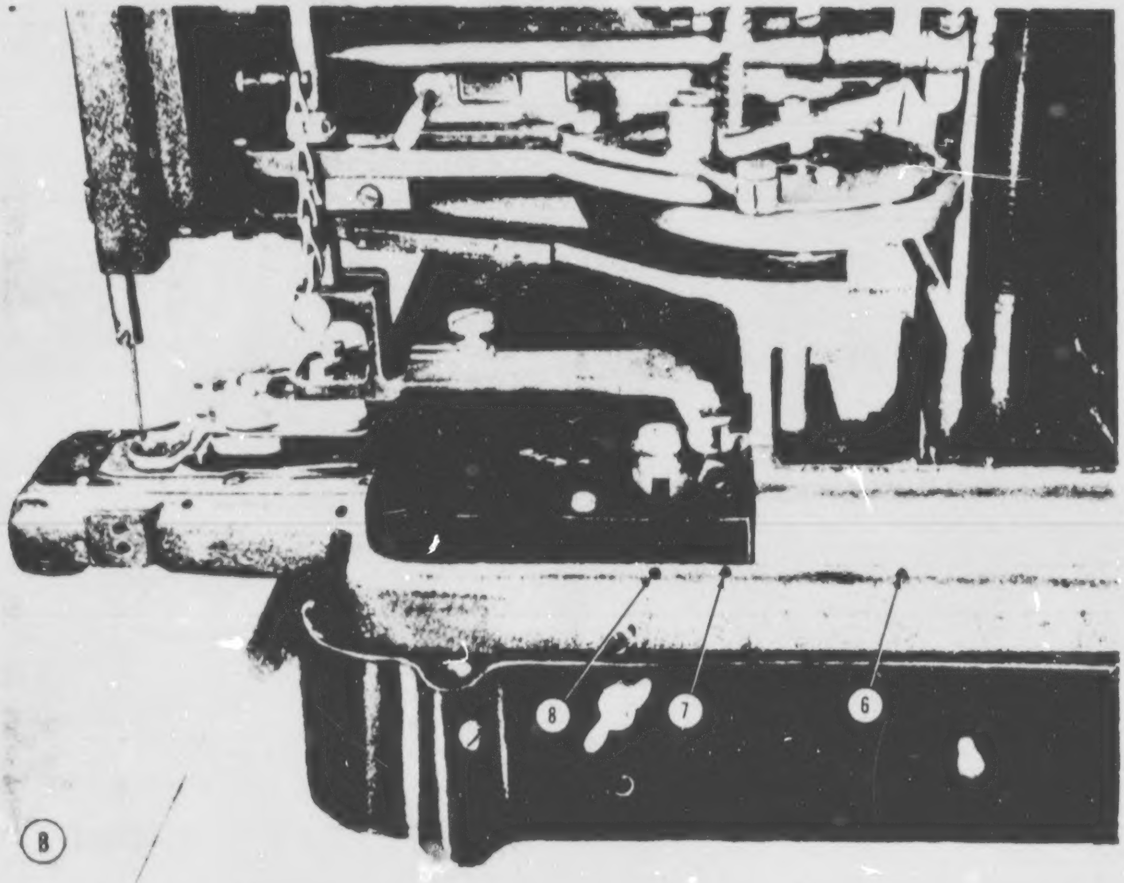
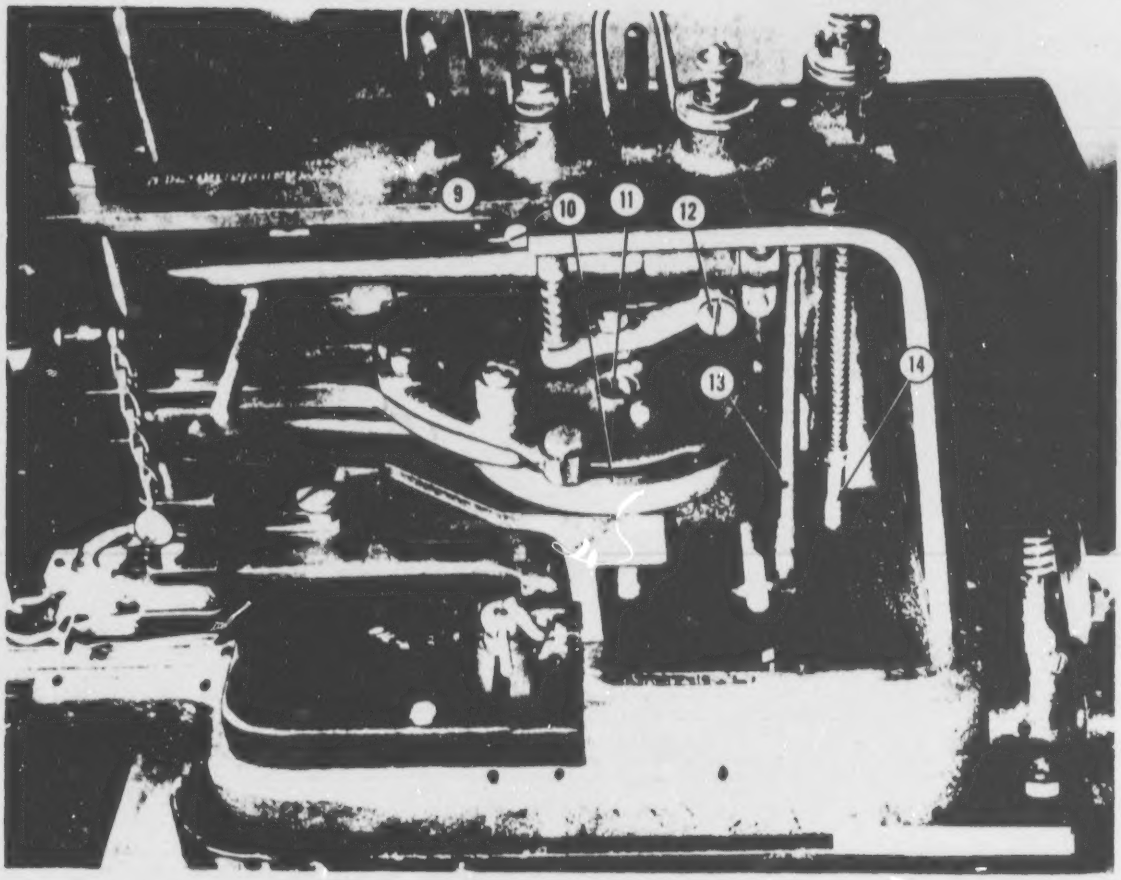


Figure 57 — Continued.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14

Figure 57 — Continued.

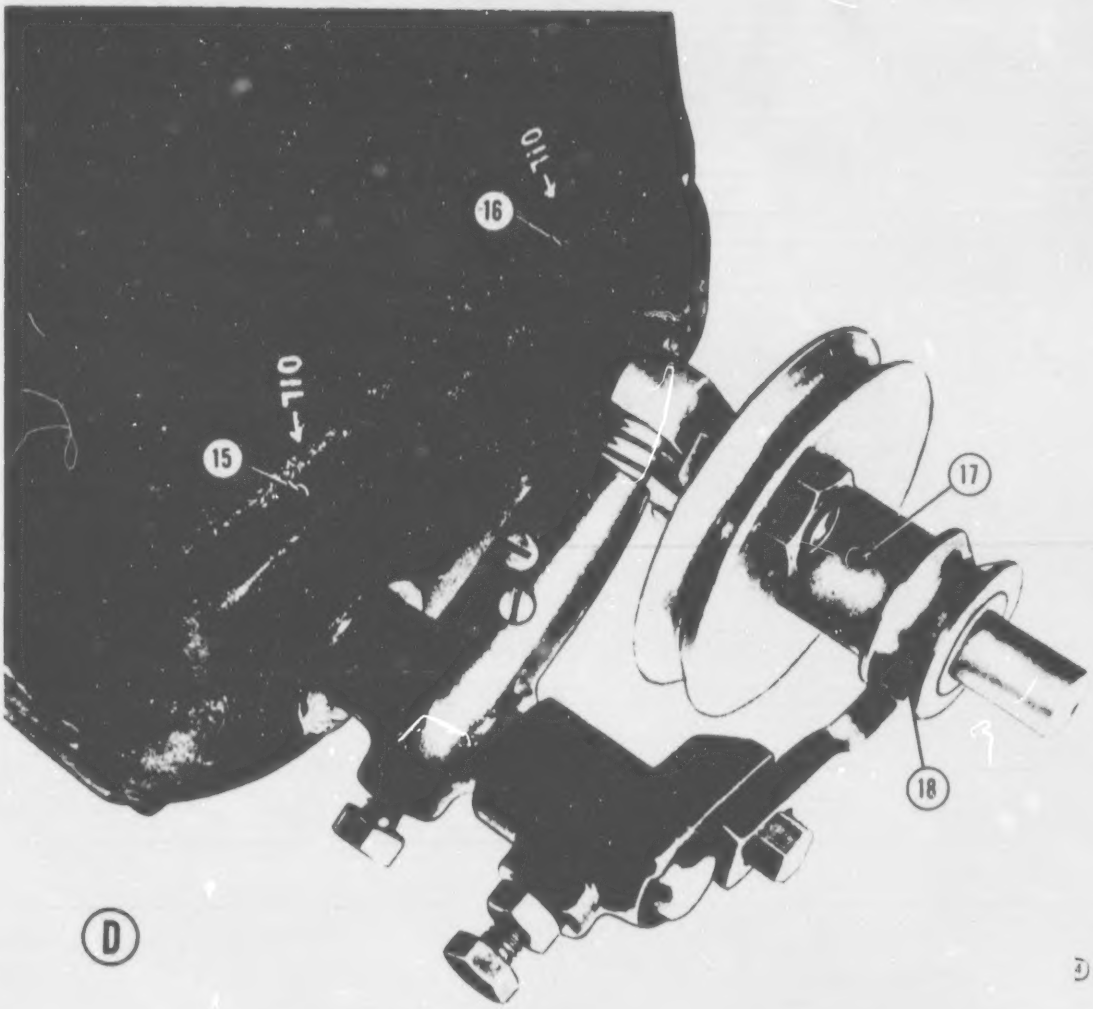
OIL
16
OIL
15
17
18
D

Figure 57 — Continued.

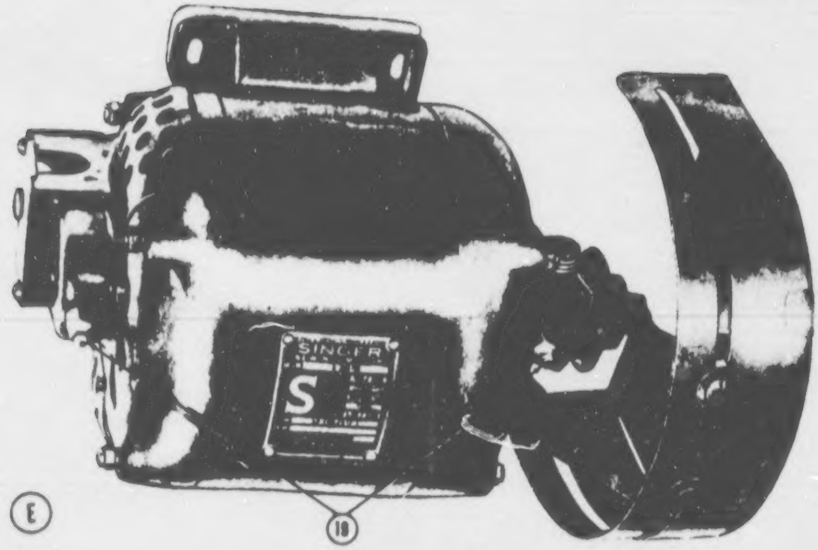
SINGER
S
E
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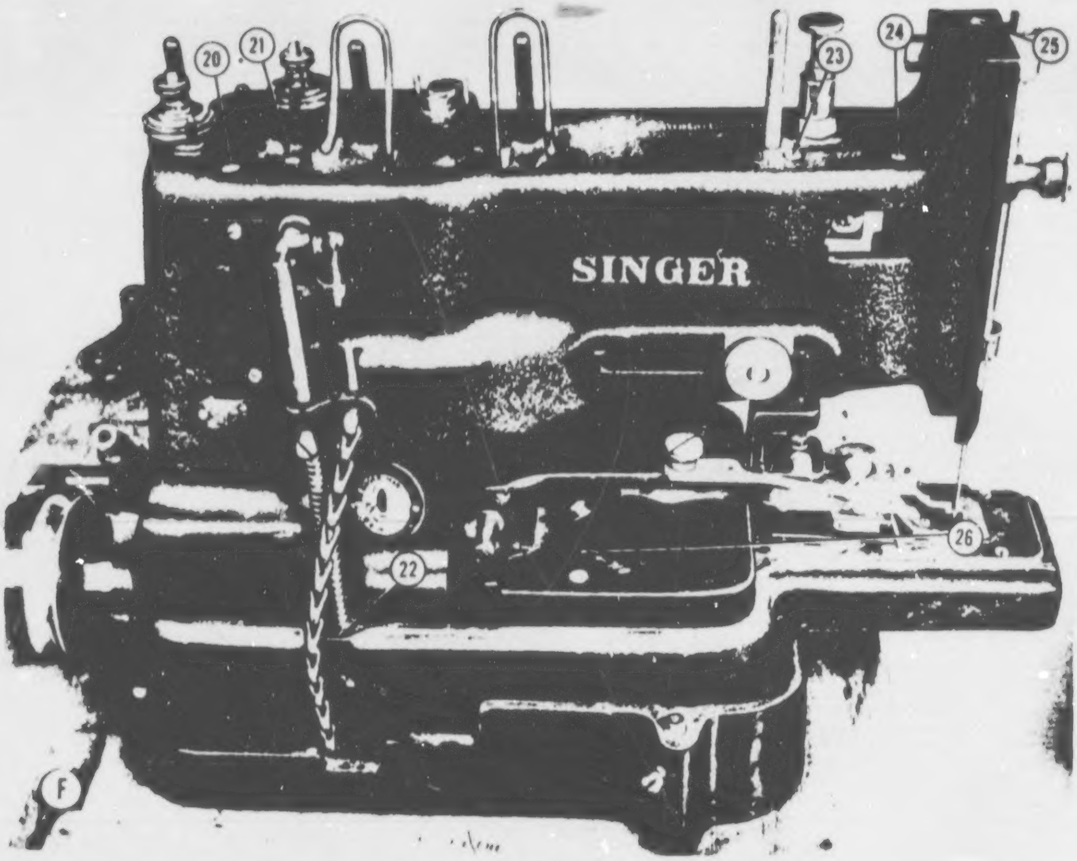
Figure 57 — Continued.


20
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SINGER
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Figure 57 — Continued.

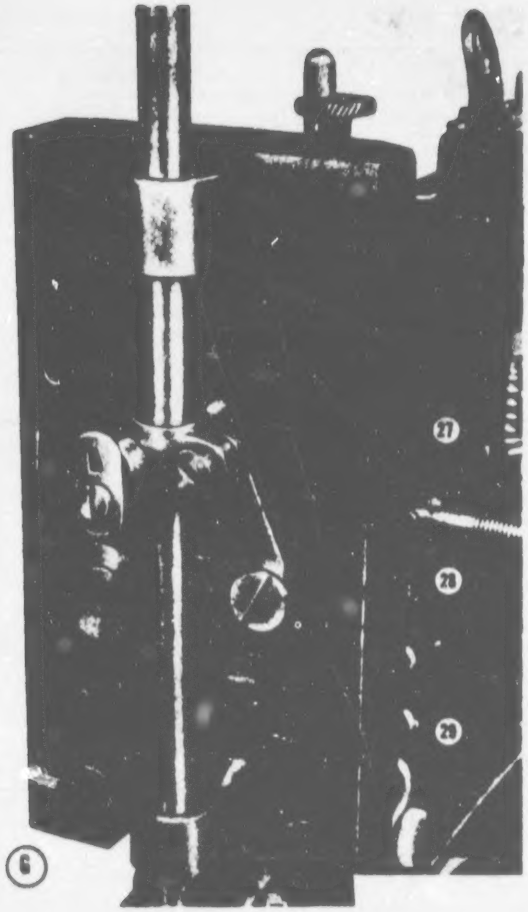
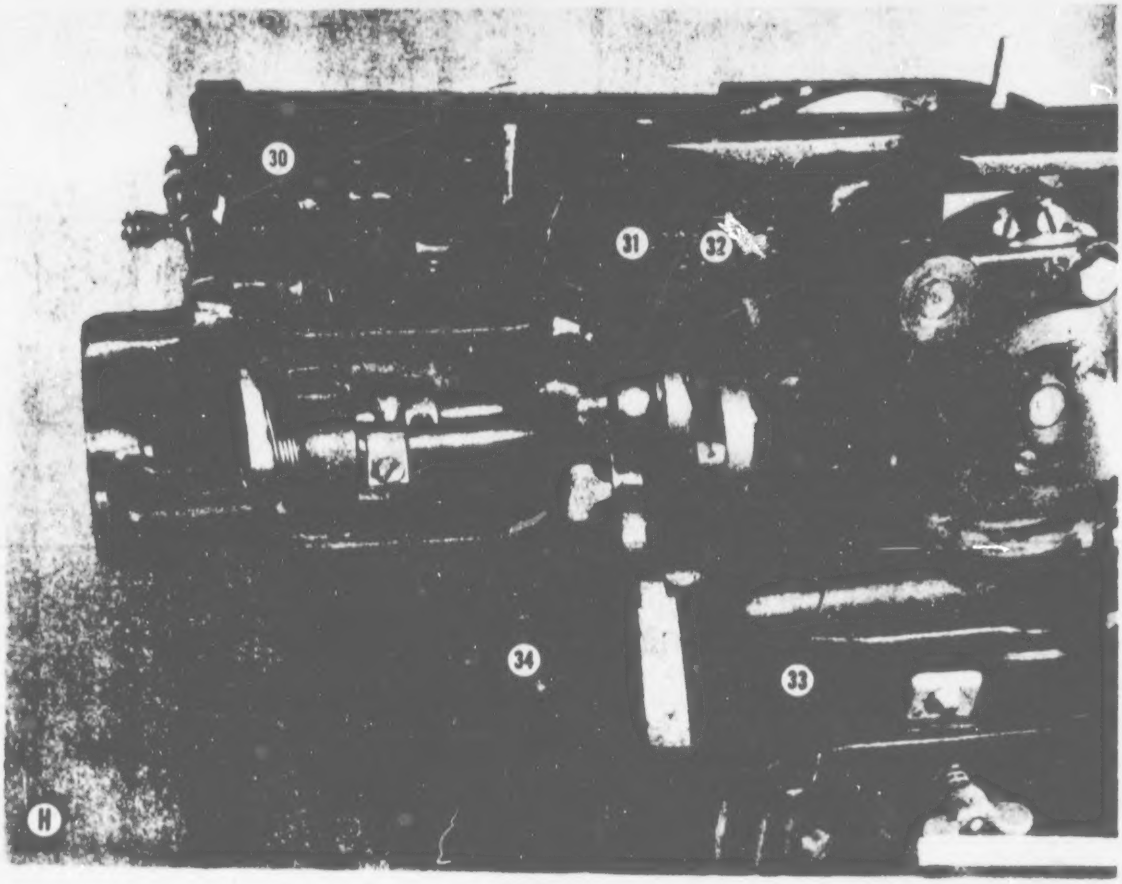


Figure 57 — Continued.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H

Figure 57 — Continued.

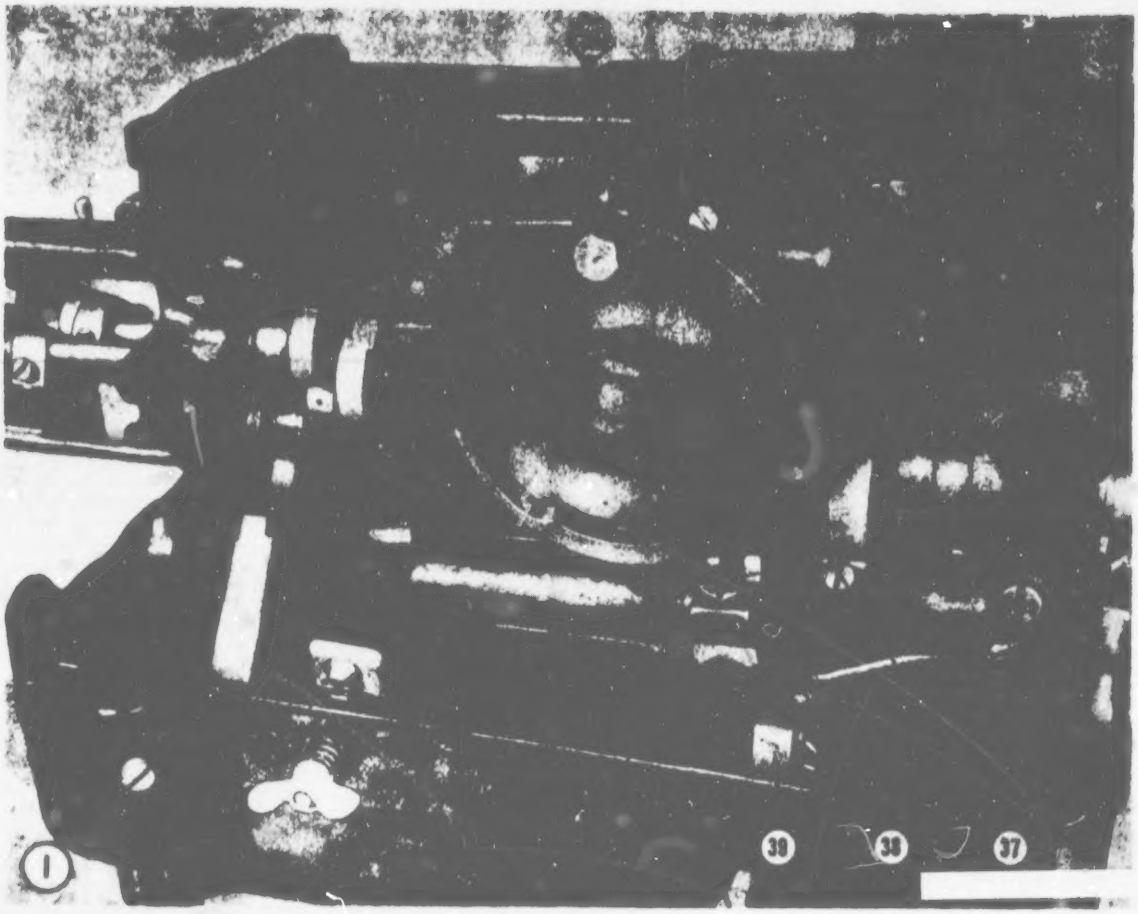
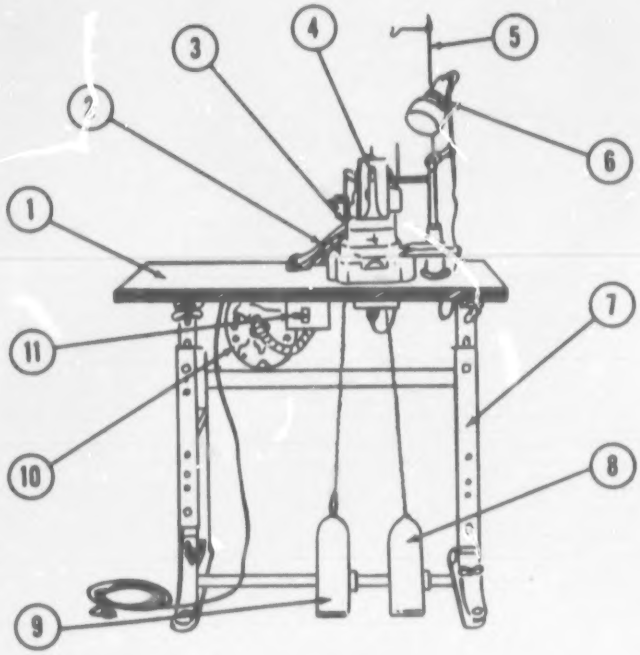


Figure 57 — Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 10-3530-203-10 **MACHINE, SEWING, BUTTON**



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	TABLE ASSEMBLY. Inspect the table assembly for cut, cracked, broken, warped, and dirty tabletop; for loose or missing bolts and nuts; and for loose mounting to the folding stand. Make certain the table assembly is level. Inspect for bent or broken components. Inspect the components for loose or missing bolts and nuts, and for loose mounting to the table assembly.	

Figure 58

315

ITEM		PAR REF
2	DRIVE BELT GUARD. Inspect the drive belt guard for bends, dirty surface, loose or missing screws, and loose mounting.	
3	DRIVE BELT AND PULLEYS. Inspect for broken, frayed, and excessively worn drive belt. Inspect the belt for loose mounting on the pulleys. Inspect the pulleys for cracked, chipped or broken edges, and loose mounting. Check for a 1-inch distance between the sides of the belt when both sides of the belt are pressed inward midway between the pulleys.	
4	BUTTON MACHINE HEAD. Inspect the button machine head for dirty surfaces and grease deposits; for bent, broken, loose, or missing components; and for loose mounting. Inspect the needle for broken or excessively worn point; for bent or broken shaft; and for loose mounting.	
5	THREAD UNWINDER. Inspect the thread unwinder for loose or missing bolts, nuts, and screws; for bent or broken components; for corroded surfaces; and for loose mounting.	
6	LAMP ASSEMBLY. Inspect the lamp assembly, bracket, and stand for loose or missing bolts, nuts, and screws, and loose mounting. Inspect for dirty, cracked, or broken housing and lens. Inspect the electrical cord for frayed insulation and broken wiring. Inspect for a broken lamp switch. Check the switch for improper operation, and make certain the lamp (bulb) is not burned out.	
7	FOLDING STAND. Inspect the folding stand for bent or broken components; for loose or missing bolts and nuts; and for loose mounting to the table assembly. Make certain the folding stand is level on the floor.	
8	STARTING TREADLE. Inspect the starting treadle for bent, broken, loose, or missing components, and loose mounting. Press the treadle and make certain that the pulley shifter engages with the machine drive pulley.	

Continued.

ITEM		PAR REF
9	BUTTON CLAMP LIFTER TREADLE. Inspect the button clamp lifter treadle for bent, broken, loose, or missing components, and loose mounting. Press the treadle to make certain that the lifting rod raises and lowers the button clamp.	
10	ELECTRIC MOTOR. Inspect the electric motor for dirty surfaces and grease deposits; for bent, cracked, or broken housing; for loose or missing bolts and nuts; for loose electrical connections; and for loose mounting. Observe the motor for unusual noise and excessive vibration (during operation).	
11	MOTOR SWITCH. Inspect for broken or bent motor switch. Inspect it for loose mounting in the switch box. Check the switch for improper operation; make certain it turns the motor on and off.	
	NOTE 1. OPERATION. During operation observe for any unusual noise or excessive vibration.	

Continued.

SECTION XXVII

PREPARATION FOR OPERATION, MODEL 175-60/61 BUTTON MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instructions, the instructor will discuss the preparation of the model 175-60/61 button machine. This will include proper threading procedures and installing the needle.

B. Objective

As a result of this instructions, the student, given appropriate references, unthreaded model 175-60/61 button machine, threading chart, appropriate needles, tools, and supplies, will be able to prepare model 175-60/61 button machine for operation by installing needle in needle bar with groove of needle facing operator, threading the machine according to threading chart, and selecting and installing the various attachments in accordance with the type of button used.

II. Presentation

A. Selecting Needle - Select the correct needle of the correct size (16 or 18) and the class number and variety number (175x3 or 175x7) according to the thread and the material to be used for the operation of the button machine. The size of the needle describes the gage of the needle eye, and it is determined by the size of smooth left twist thread which must pass freely through the eye of the needle. Rough or uneven thread or thread which for any reason does not slip easily through the eye of the needle interferes with the operation of the machine. The class number describes the shank of the needle, the variety number describes the length of the needle and type of point on the needle, and the size describes the gage and the eye of the needle.

B. Installing Needle - Loosen the needle setscrew and remove the needle from the needle bar. Then install the correct needle into the needle bar as far as it will go with the long groove of the needle in front of or facing the operator. Tighten the needle setscrew securely.

C. Threading Needle - Thread the needle following the instructions in paragraph VI B, of the practical exercise.

D. Safety Precautions - When making adjustments, threading or installing the needle of the button machine make certain the power source is turned off. Keep foot off the starting treadle.

PREPARATION FOR OPERATION, MODEL 175-60/61 BUTTON MACHINE

PRACTICAL EXERCISE

I. Introduction

During this period the student will have the opportunity to properly prepare the model 175-60/61 button machine for operation. The student will learn to install the needle and thread the machine as outlined in paragraph VI B.

II. Study Reference

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Clothing Repair Shop. Section III, page 139, 140, paragraph 159.

III. Tools and Supplies Required:

Model 175-60/61 Button Machine

Screwdriver (1 per machine)

Thread (1 cone per machine

Rags (cleaning) (ample supply)

IV. Instructions to Student

1. Student will perform the practical exercise following the step procedures as outlined in paragraph VI B.

2. Student will call on instructor for assistance when needed.

3. Student will observe the safety precautions in preparing the model 175-60/61 button machine.

V. Performance Standards

Instructors will use performance standards as outlined in paragraph VI, A. These standards are established to enable the instructor to check the student performance and final results of students workmanship.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

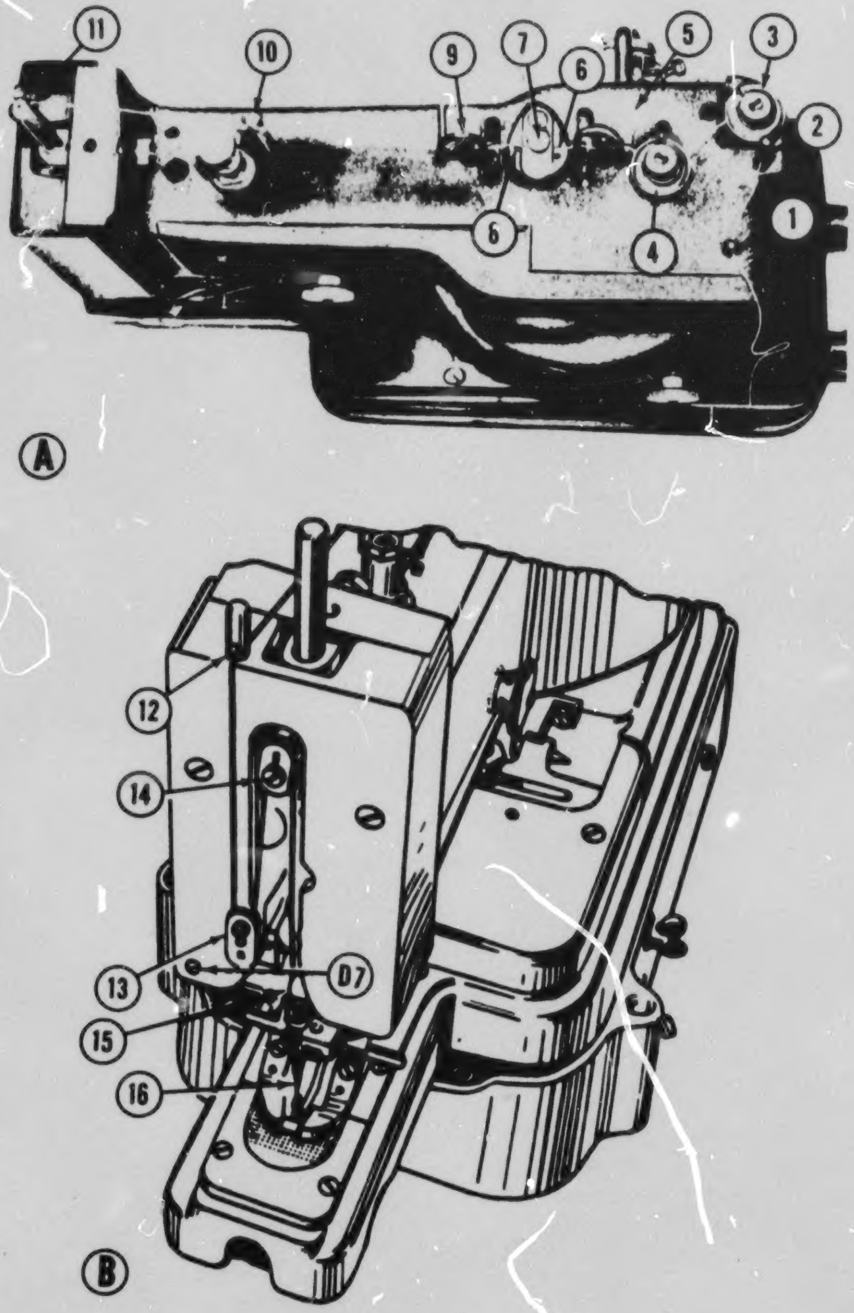
1. Proper procedures followed in threading the machines.
2. Needle of the correct class and variety (175x7).
3. Needle installed with long groove facing the operator.
4. Students observing the safety precautions in preparing the machine for operation.

B. The performance steps to be used by the students in performing the practical exercise are as follows:

Threading the model 175-60/61 button machine.	(CAUTION - Make sure motor is turned OFF and Belt removed).
1. Run the thread from thread cone up and over the thread unwinder.	1. a. Left hand twist thread must be used. b. Make sure thread is not under the cone of thread.
2. Run the thread from the unwinder through the back eyelet.	2. Thread from right to left when facing machine.
3. Run the thread from the thread eyelet to the automatic tension eyelet.	3. From right to left.
4. Run the thread from eyelet thru automatic tension.	4. a. Right side of automatic tension. b. Thread must be between the tension disks.
5. Run the thread from the automatic tension to the stationary tension.	5. a. Right hand side of assembly. b. Thread must be between the tension disks.
6. Run the thread from the stationary tension thru the thread pull-off (back) eyelet.	6. a. From rear to front. b. Have thread pull off to the right.

7.	Run the thread from the thread pull-off (back) eyelet to the thread nipper guide pin.	7.	a. Two (2) pins are required. b. Between the two pins. c. Push the thread nipper release button and pull thread underneath.
8.	Run the thread from the thread nipper guide pins to the thread nipper plate.	8.	a. Depress the thread nipper releasing screw. b. Pressure on this screw releases the thread from the grip of the nipper.
9.	Run the thread from between the nipper plate to the right guide pin.	9.	Right hand side when facing machine.
10.	Run the thread from the right guide pin to the thread pull-off (Front Eyelet).	10.	Have thread pull off, to the right of pin when facing machine.
11.	Run the thread from the thread pull-off (front) eyelet to the front thread eyelet.	11.	From rear to front.
12.	Run the thread from the front thread eyelet to the upper face-plate thread guide.	12.	From rear to front.
13.	Run the thread from the face plate thread guide to the bottom roller guide.	13.	a. Run thread from left to right when facing machine. b. Make sure thread is on roller.
14.	Run the thread from the bottom roller guide to the needle bar connecting link hinge stud thread guide.	14.	Thread from left to right.
15.	Run the thread from the needle bar connecting link hinge stud thread guide to the face plate thread retainer.	15.	Push retainers open and place thread in slot.

16. Run the thread from the thread retainer down the lower end of the needle bar.	16. Place thread in thread guide on end of needle bar.
17. Run thread down and from front to rear through the eye of the needle.	17. a. Thread the needle from front to rear. b. The long groove in the needle is facing the operator. c. Make sure needle is of class and variety 175 x 7.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A
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14
13
D7
15
16
B

Figure 59 - Threading points.

A. Top view.

B. Face view.

SECTION XXVIII

ADJUSTMENT AND OPERATION OF MODEL 175-60/61 BUTTON MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

During this period of instruction, the instructor will discuss the adjustment and operation of the model 175-60/61 button machine. It is important that you know the necessary adjustments required to make the machine operate in an effective manner.

B. As a result of this instruction, the student, given model 175-60/61 button machine that he previously prepared for operation, appropriate tools, supplies, references, adjusting measurements, and deviation standards, will be able to adjust button clamp pressure to hold button firmly, adjust machine to take either two or four-hole buttons, and adjust the forward and backward motion of button clamp; given operation instructions on inserting and removing work, safety precautions in operation, thread tension charts, and appropriate references, the student will be able to sew buttons to garments, adjust thread tension in accordance with tension chart, observe all safety precautions in operating and making adjustments, perform "during operation" preventive maintenance services in accordance with lubrication charts and operator's PM check list, remove work from the machine to the satisfaction of the instructor, and perform "after operator's preventive maintenance services" according to operator's PM Check List and TM 10-3530-203-10.

II. Presentation

A. Safety Precautions - Before operating or adjusting the machine, you should understand the safety precautions.

1. While making adjustments, make certain to turn off the motor switch, or remove the drive belt before removing the needle or any part of the machine.

2. While operating the machine, keep your fingers away from the needle. If the starting lever treadle is engaged while the motor is off, when the motor is switched on, the machine will automatically make its cycle of stitches. For this reason, the operator must always make sure to check the machine before turning on the motor and keep his hands away from the needle.

3. Keep feet off the starting lever treadle until the button to be sewn is correctly placed in the button clamp. Keep hands away from the path of the needle.

4. Make certain to set the button in the clamp so that the buttonholes are centered over the needle plate and straight across the button clamp.

B. Operation and Adjustments

1. Motor Switch - A toggle or push switch, located on the right underside of the stand, starts or stops the motor.

2. Starting lever treadle - When the starting lever treadle is pressed down, the machine makes a cycle of 16 stitches.

3. Foot lifter treadle - The foot lifter treadle controls the button clamp. Press on the foot lifter treadle to raise the button clamp. After the button has been sewn on, depress the treadle to raise the button clamp before withdrawing the work.

4. Button clamp opener - After raising the button clamp with the left foot lifter treadle, operator should push back on the handle of the button

clamp opener with his left hand and insert the button with his right hand.

5. Stationary thread controller and face plate thread retainer - Increase thread tension by turning thumb nut to the right. The face plate thread retainer is also adjustable, and is adjusted by loosening the screw and moving the retainer to the left for more tension or right for less tension.

6. Button clamp screw - Adjust the pressure on the button clamp by loosening the nut and turning the screw to the right to increase the pressure or left to decrease pressure.

7. Button clamp opener adjusting lever - Adjust the opening of the button clamp by opening the clamp and placing in the jaws a button of the desired size. Loosen the thumbscrew move the adjusting lever to a point where it just clears the button screw, and tighten the thumbscrew.

8. Hinge pin - Adjust the machine to sew two hole buttons by removing the hinge pin and inserting this pin in the hole for two-hole buttons. Adjust machine to sew four-hole buttons by inserting the pin the four-button hole.

C. Operating Features

1. The machine uses a needle thread only and sews a chainstitch. It has no shuttle race, sewing hook, or bobbin. The stitch is formed by a looper and thread finger using standard needle thread.

2. If the machine is set to sew two-hole buttons, it makes one bar of stitches from hole to hole for a total of 16 stitches with one operation of the starting treadle. If the machine is set to sew four-hole buttons, only one operation of the starting treadle is necessary. It makes a bar of single-thread stitches through the back two holes, a crossover stitch from the back

holes to the front two holes, seven stitches through the front two holes, and one knotting stitch.

3. When sewing a two-hole button, the needle bar vibrates like a pendulum. When the machine is set to sew a four-hole, the needle bar still vibrates as the first seven stitches are being completed in the back two holes of the button. The button clamp then moves back to the rear position and carries the button and material with it. The needle continues to sew from hole to hole until the front two holes are completed. The last stitch to be made is the knotting stitch.

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ADJUSTMENT AND OPERATION OF MODEL 175-60/61 BUTTON MACHINE

PRACTICAL EXERCISE

I. Introduction

A. Orientation and Motivation

During this practical exercise you will be instructed to make adjustments and operate the model 175-60/61 button machine. You will find that the button sewing machine is the most difficult machine to understand and operate as far as adjustments and operations are concerned.

II. Study Reference

TM 10-3530-203-10 Operator's Manual, Textile Repair Shop, Clothing Repair Shop, Section III, paragraph 160, pages 141-142.

III. Supplies and tools required

Model 175-60/61 Button Sewing Machine

Screwdriver (1 per machine)

Rags, cleaning (ample supply)

Buttons (ample supply)

Material for test sewing (ample supply)

Oil Can (1 per machine)

Needles

IV. Direction to Students

A. Observe the demonstration given by the instructor.

B. Follow the step procedures as outlined in paragraph VI B.

C. Call instructor for assistance when you are experiencing adjustment or operation difficulty.

D. You are cautioned to use the proper screwdrivers and avoid burring the heads of the screws while making adjustments.

V. Performance Standards

The performance checking standards are established to enable the instructor to check student performance and workmanship during the practical exercise.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Have threading and adjustments been made properly?
2. Have proper tools been used?
3. Proper needle (class and variety) been used?
4. Proper size thread used?

B. The procedures to be used by the students during the practical exercise in adjustment and operation of the model 175-60/61 button machine are listed as follows:

Adjusting Tension on Thread.	
1. Adjust stationary thumb nut.	1. a. Turn thumb nut to right to increase tension (if tension is too tight, thread will break). b. Turn thumb nut to left, to decrease tension (if tension is too loose, thread will ball up under needle). NOTE: DO NOT adjust automatic tension. This is maintenance mechanic's adjustment.
Adjusting Opening in Button Clamp.	
1. Open button clamp.	1. a. Use button clamp spreader handle. b. Adjust opening, just enough to hold button firmly.
2. Move adjusting lever.	2. a. Loosen adjusting lever thumbscrew. b. Move lever to a point where it just clears the button stop screw. c. Tighten the adjusting lever thumbscrew securely.

Adjusting Pressure on Button Clamp.	
1. Loosen the pressure regulating lock-nut.	1. a. Turn regulating thumbscrew to the right to increase pressure. b. Turn thumbscrew to left to decrease pressure.
2. Tighten the pressure regulating locknut.	2. Tighten securely when desired adjustment is made.
Adjusting for Two-Hole and Four-Hole Buttons.	
1. Place hinge pin in upper hole.	1. Upper hole is for two-hole buttons.
2. Place pin in lower hole.	2. Lower hole is for four-hole buttons.
Adjusting Forward and Backward Motion of Button Clamp.	
1. Loosen feed plate carrier regulating nut.	1. a. Place handle in one of the four holes in the regulating nut. b. Place handle into a convenient position for turning regulating nut. c. Turn handle to loosen nut.
2. Slide nut to the left, or to the right.	2. a. Slide to the left to increase forward movement. b. Slide to the right to decrease forward movement.
3. Tighten regulating nut.	3. After adjustment is made, tighten the regulating nut securely.
Operation of Button Machine	
1. Turn power source on.	1. a. Before turning switch on, make sure hands are not under needle. b. Make sure feet are off of foot treadle. c. Turn motor switch on.
2. Raise button clamp.	2. a. Depress button clamp lifter treadle. b. Make sure you move the button clamp lifter treadle, and not the starting treadle. c. Press down on the lifter treadle, with your foot. To raise the button clamp. d. Keep foot on lifter treadle and keep button clamp raised.

3. Open button clamp.	3. a. Push button clamp spreader handle to the area to open. b. Push back far enough to take the size button you intend to sew. c Hold spreader handle to the rear, and still keep your foot on the lifter treadle.
4. Place button into buttom clamp.	4. a. Place button onto clamp with button holes running parallel with front edge of working table. b. Release button clamp spreader handle, but still keep your foot on the lifter treadle. c. Make sure button is firmly set into clamp jaws and aligned properly (parallel with working table).
5. Place material under button.	5. a. Place material in a portion so the button will be stitched exactly where you want it. b. Now release pressure on button clamp lifter treadle by taking your foot off of the treadle. c. Button will rest on material.
6. Stitch button on material.	6. a. Before stitching, check button one more time to make sure it is aligned properly. b. Make sure your hands are out from under the needle. c. Press your foot on the starting treadle with one quick, firm, press and take your foot off of starting treadle. d. Machine will automatically stitch button and come to a stop.
7. Remove material and button from machine and shut machine off.	7. a. Make sure your foot is not on the starting treadle. b. Place your foot on the lifter treadle to raise button clamp. c. Hold your foot down on lifter treadle.

d. This action automatically cuts the thread and releases the needle thread from the material.
e. Push back the button clamp handle and remove button and material from machine.
f. Now release your foot from the lifter treadle and shut off power source.

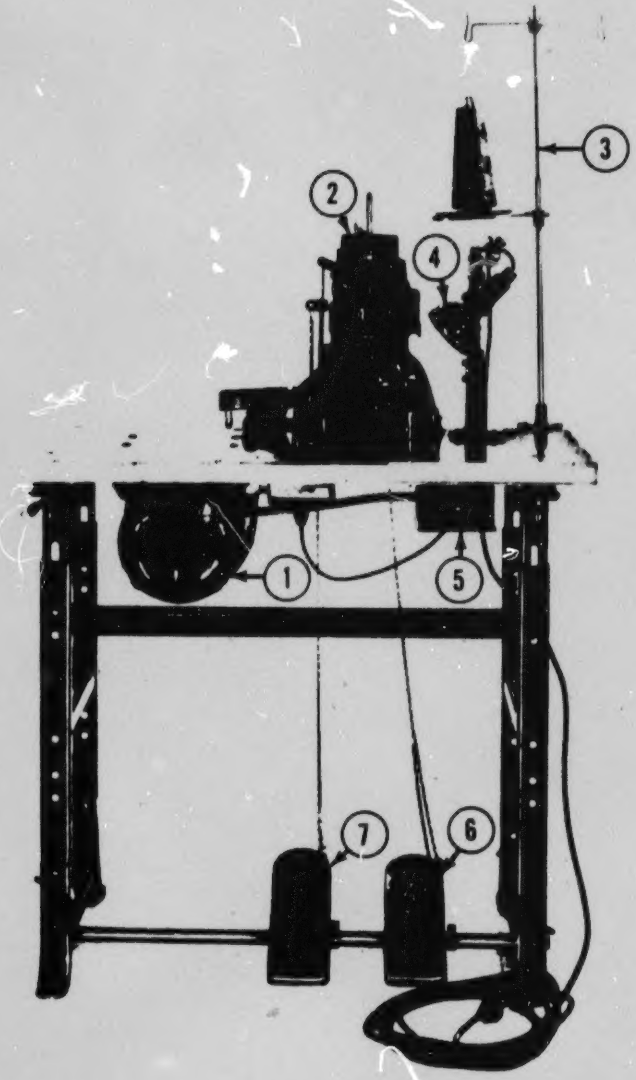
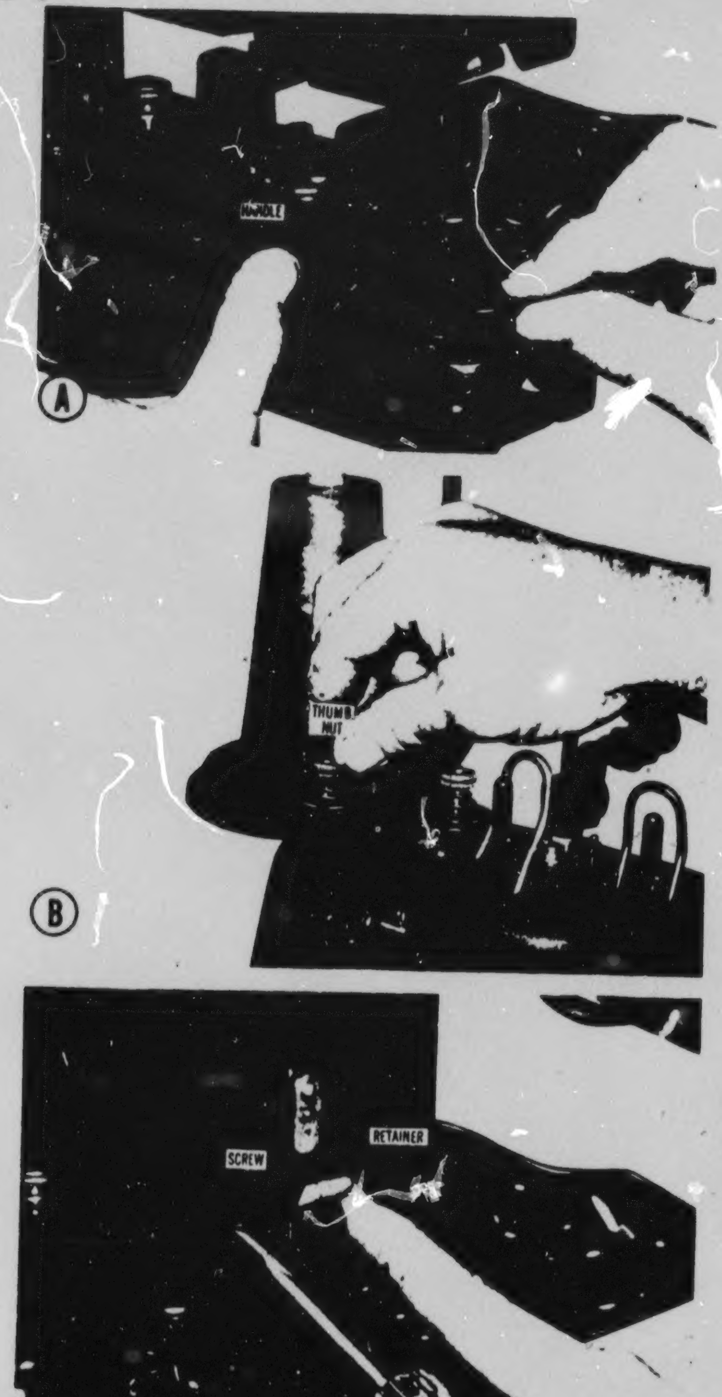


Figure 60 - Model 175-60 button sewing machine.

1	Motor	5	Switchbox
2	Face	6	Starting lever treadle
3	Thread stand	7	Foot lifter treadle
4	Lamp		


HANDLE
A
THUMB NUT
B
RETAINER
SCREW
C

A. Operating button clamp opener

B. Adjusting thread tension

C. Adjusting face plate thread retainer

Figure 61 - Operating and Adjusting Procedures

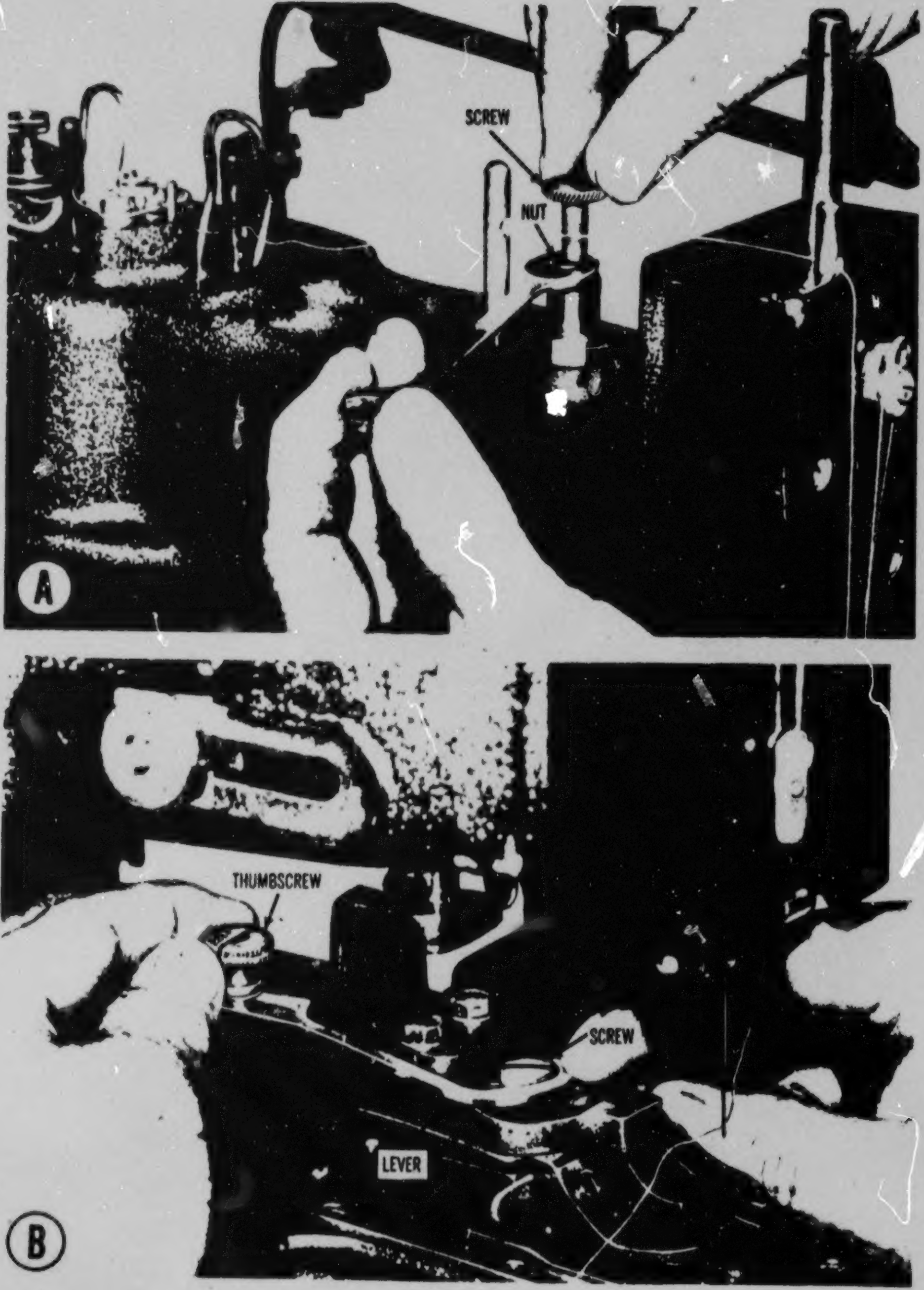

SCREW
NUT
A
THUMBSCREW
SCREW
LEVER
B

Figure 62 - Adjusting the button clamp.

A. Turning the adjusting screw

B. Loosening thumbscrew and moving adjusting lever

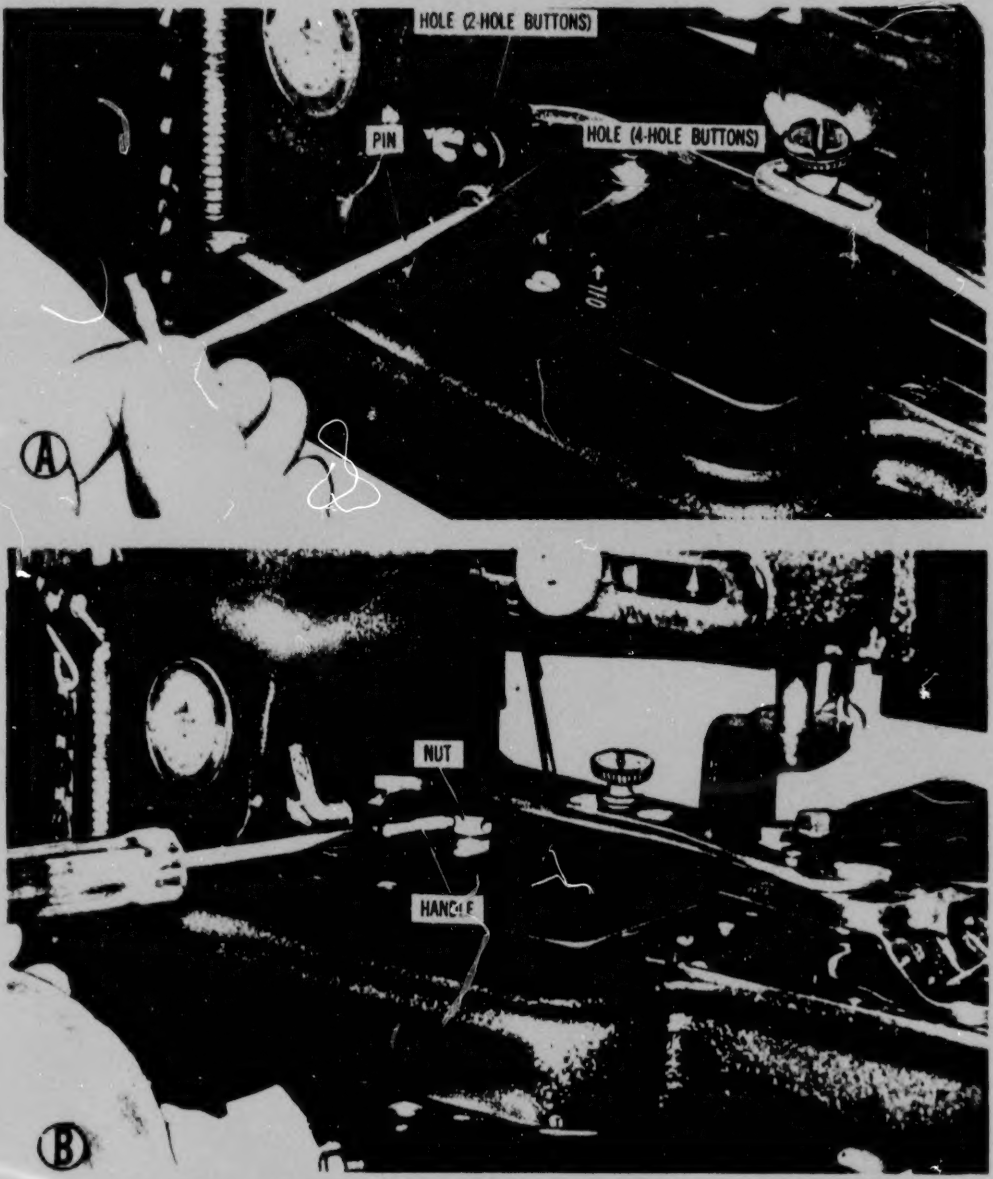

HOLE (2-HOLE BUTTONS)
PIN
HOLE (4-HOLE BUTTONS)
A
NUT
HANDLE
B

Figure 63 - Use of hinge pin and adjusting feed plate carrier regulating nut.

A. Inserting hinge pin in hole

B. Screwing handle into hole of regulating nut

SECTION XXIX

TROUBLESHOOTING MODEL 175-60/61 BUTTON MACHINE

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss troubleshooting the model 175-60/61 button machine. Troubleshooting as we learned in previous hours is the detection and correction of malfunctions of the sewing machine.

2. Although this hour is the last of operator maintenance, adjustments and operation of the various sewing machines which you will encounter as textile repairmen, it will definitely not be the last time you will hear "preventive maintenance service" or "make necessary adjustments to your machine." These phrases will be heard throughout the remainder of this course, and should be taken with you and utilized in your assignment in the future.

B. Objective

As a result of this instruction, the student, given appropriate references, tools, supplies, troubleshooting chart, and model 175-60/61 button machine with eight malfunctions as outlined in troubleshooting chart, will be able to detect and correct all previously established malfunctions.

II. Presentation

A. The instructor will go over the following former malfunctions and tell the student what to do to make corrections.

1. Needle Breakage

a. Causes of needle breakage the operator can correct:

(1) Needle wrong size, class and variety - install

proper needle.

(2) Needle bent or blunt point - install serviceable needle.

(3) Button not aligned firmly and correctly in clamp- Align button.

(4) Stepping on starting treadle before letting button clamp down - do not step on treadle until clamp is down.

(5) Raising button clamp before machine stops - do not raise button clamp until machine stops.

(6) Button clamp is not set to correspond with button holes - set button clamp.

(7) Feed plate not locked in - lock feed plate securely.

(8) Clamp adjusting lever is out of adjustment - adjust lever thumbscrew.

b. Causes of needle breakage the operator cannot adjust, but must report to his next in command for correction.

(1) Button clamp out of adjustment.

(2) Needle bar vibration off.

(3) Needle guide out of adjustment.

(4) Thread finger out of time.

(5) Looper out of time or adjustment.

(6) Needle bar or feed plate operating cam is out of time.

(7) Thread ripper out of adjustment.

2. Thread breakage.

a. Causes of thread breakage - the operator can correct.

(1) Machine improperly threaded - rethread machine.

(2) Needle wrong size, class, or variety - install correct needle.

(3) Needle point blunt, or broken - install serviceable needle.

(4) Thread tension too tight or loose - adjust thread tension.

(5) Thread damp or defective - use good, dry thread.

(6) Right-twist thread being used - use left-twist thread.

(7) Incorrect size of thread being used - use correct size thread for needle and material.

(8) Needle installed incorrectly in needle bar - install needle correctly.

b. Causes of thread breakage operator cannot correct, but must report to his next in command for correction.

(1) Needle strikes button.

(2) Looper out of adjustment.

(3) Looper has rough edges or is bent.

(4) Needle guide out of adjustment; bent, burred, or broken.

(5) Thread finger bent, burred, or broken.

(6) Automatic tension is out of adjustment.

(7) Thread ripper out of adjustment.

3. If any deficiencies or malfunctions are found with the electrical system of the machine, such as broken cords, switch does not work,

unusual noises with the motor, or motor does not pull the load, report them to your next in command, because they may be very serious, and need attention right away.

B. Student Practical Exercise

1. The instructors will set-up the following malfunctions on the button machines.

a. Machines improperly threaded.

b. Wrong class of needle.

c. Thread tension too tight.

d. Thread of incorrect size.

e. Needle installed in needle bar incorrectly.

f. Button aligned incorrectly in clamp.

g. Bent needle.

h. Feed plate not locked in.

2. The students will not operate the machines nor will they turn the switches on. Machines will not be plugged into the electrical outlets.

3. Each student will visually check his machine and make a list of the malfunctions he finds.

4. Instructors will supervise the PE, making sure that students DO NOT operate nor plug the machines into the electrical outlets. Instructors will also make sure that each student gets to check a machine, and makes out his list of findings.

5. Students will retain the list of findings, and use them during the critique of the hour, when they are called upon to give a summary of their findings.

QMS 200.1 WB1
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STUDENT WORKBOOK

PART II

CLOTHING AND TEXTILE REPAIR

U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA

SUPPLY TRAINING CENTER OF THE ARMY SCHOOL SYSTEM

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JAN 13 1976

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SECTION XXX

SIMPLE SEAM AND SEAM TYPE #1

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the construction of Simple Seam and Seam Type #1. This period begins a new subcourse in Machine Sewing. The Simple Seam and Seam Type #1 will be the first of seven various types of seams you will learn to construct. Each of the seven seam types vary in characteristics, but each serves a definite purpose in the construction or alteration of clothing. These seam types are designed to give strength as well as appearance to the garment.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the characteristics of properly constructed seams and stitching to the satisfaction of Federal Standard No. 751 and describe the appropriate uses of the simple seam and seam type #1; given specially prepared 8x8 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to each seam, and performance standards will distinguish between the face and the underside of the material, match the grain of both pieces of material, and construct and tack each seam to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Characteristics of Seams

The characteristics of a properly constructed seam or stitching, are strength, elasticity, durability, security, and appearance. The end use of the item will govern the relative importance of these characteristics, and the selection of the seam and stitch type, should be based upon these considerations

1. Strength - The strength of the seam or stitching should equal that of the material it joins in order to have balanced construction that will withstand the forces encountered in the use of the item of which the seam is a part. The elements affecting the strength of a seam or stitching are:

   a. Stitch Type

   b. Thread strength

   c. Stitches per inch

   d. Thread tension

   e. Seam Type

   f. Seam efficiency of the material

2. Elasticity - The elasticity of a seam should be slightly greater than that of the material which it joins, so that the material will support its share of the forces encountered in the end use of the sewn item. The elasticity of a seam or stitching depends upon:

   a. Stitch Type

   b. Thread elasticity

3. Durability - The durability of a seam or stitching, depends largely upon its strength and the relation between the elasticity of the

seam and the elasticity of the material. To form a durable seam or stitching in materials, the thread size must be properly chosen, and the stitches will set to the material (without undue tension which will unbalance the elasticity and cause puckering) to minimize abrasion and wear by contact with outside agencies.

4. Security - The security of a seam depends chiefly upon the stitch type and its susceptibility to become unraveled. The stitch must be well set to the material to prevent snagging which can cause rupture of the thread, and unraveling of certain of the stitch types.

5. Appearance - The appearance of a seam or stitching, generally is governed by the proper relationship between the size and type of thread, the length of stitch or number of stitches per inch, and the texture and weight of the fabric. In addition to this relationship, the technique and skill of the sewing machine operators, also govern the appearance of the seams and stitching. Some of the factors which will adversely affect the appearance are as follows:

a. Stitch defects

  (1) Loose stitches

  (2) Poorly formed stitches

  (3) Crowded stitches

  (4) Tight stitches

  (5) Crooked stitches

  (6) Skipped stitches

b. Seam and stitching defects

  (1) Puckers

  (2) Twists

(3) Pleats

(4) Raised seams

(5) Raw edges exposed

B. Use of Simple Seam

1. We can say that the Simple Seam is the basic seam used in making most of the other seam types.

2. The Simple Seam is normally found on side seams and/or back seams of a garment. (Example: Trousers, khaki and AG-44. Coats AG-44).

C. Construction of the Simple Seam

1. Student will be given a piece of material 8x8 inch square.

2. Cut the material (8" x 8") in two pieces, forming 4" x 8" pieces.

3. Place material together face to face (all four edges square).

4. Mark edge of material 1/2" from raw edge on the 8" length.

5. Place the material on the machine in such a manner that the mark is in a vertical position.

6. Start at top of marking on edge of material, and stitch down to bottom edge of material.

7. At this time it is important to bring to the attention of all students, that a 1" tacking stitch will be applied to all stitch lines at the beginning and end of each seam made. This procedure will continue throughout the course and should continue even after leaving this school. Deviation standards established by the School will not allow a tack less than 7/8" or more than 1 1/8".

8. Press seams open with the hand iron (Iron is located at the

rear of the classroom).

D. Use of Seam Type #1

1. Seam Type #1 is commonly used on all types of clothing. Example: you will find Seam Type #1 in several areas of the clothing you are now wearing "fatigues". (The trouser bottoms, bottom of sleeve, and around bottom of utility jacket.)

2. Seam Type #1 will also be found on sheets and pillow cases, as well as many items of textile or special projects which you will be called upon to construct, such as curtains or draperies.

3. Seam Type #1 is so constructed so that the raw edge of the material is turned under, and not visible to form a hem. This will strengthen the seam and prolong the life of a garment at the hem area. Seam Type #1 is commonly known by another name—"HEM", because the construction of Seam Type #1, forms a hem.

E. Construction of Seam Type #1

1. Place a piece of material 4" x 8" on table face up.

2. Mark on the face side of material, 1½" from the edge, a straight line across the length of material (8" length).

3. Apply the second line 1/2" from the edge across the length of the material.

4. Fold material on the first mark made 1 1/2" from edge.

5. Fold material again on the ½" mark made forming a hem. (The overall width of the hem when folded should be 1" at this time.)

6. Place material on machine keeping the material folded.

7. Starting on the end of the hem and on the ½" turn under, sew a row of stitches 1/16" from the folded edge, the length of the hem. Each

end of the stitch line should be tacked.

8. Press material flat with hand iron.

F. Operator's maintenance and maintaining DA Form 2404.

1. It will be necessary for you to properly maintain and perform operator's maintenance on the sewing machine assigned to you throughout this subcourse of machine sewing.

2. An important factor will be to keep your machine free of dirt and lint.

3. Make certain to lubricate all oil points as required. The Shuttle race will be lubricated everytime a full bobbin is inserted.

4. It will be your responsibility to maintain DA Form 2404 as required.

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SIMPLE SEAM AND SEAM TYPE #1

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of the simple seam and seam type #1. At this time the instructor will bring out the key points to remember in the construction of these seam types. Following the demonstration, students will perform the practical exercise in the construction of the simple seam and seam type #1.

II. Study References:

TM 10-267 "General Repair for Clothing and Textiles"

Page 13, par 9, b, c, fig 11; pg 14, fig 12.

III. Tools, Supplies, and Equipment Required:

8 x 8 pieces of material (ample supply)

Tailors Tool Kit (1 set per student)

31-15 Sewing Machine (1 per student)

Thread (2 cones per machine)

IV. Directions to the student

Follow the production steps outlined in paragraph VI B. If during your practical exercise, you have any questions or doubts, call the instructor for assistance.

V. Performance Standards

The performance standards in Paragraph VI, A are established to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

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VI. Job Breakdown

A. The performance standards that will be used by the instructor during and after the student practical exercise are as follows:

1. Stitch lines straight and evenly spaced from edges.
2. Stitch lines tacked at both ends (1" tack).
3. Measurements used accurately (1" hem on seam type #1, and ½" seam on simple seam).
4. Hem even and no raw edges shown (seam type #1).

B. The production steps for constructing a simple seam and seam type #1 are listed to the left of the page in the breakdown below. The key points which correspond in number to the production steps for each breakdown are listed to the right of the page.

Simple Seam

1. Prepare Material.	1. a. Cut a piece of 8 x 8 inches of material in half to 4 x 8 inches. b. Place the two pieces of material together squarely ov[illegible] each other, and face to face. c. Mark a line ½" from the edge of material on the 8" length side. (This mark should extend the entire length of the material). d. Markings should be straight and measurements accurate.
2. Sewing Seam.	2. a. Place material on sewing machine in such a manner that the marking is visible, and to the operator's right. b. Start at top of material and on the chalkmark, sew a stitch line down the entire length of the material. c. The stitch line will have a 1" (no less than 7/8" - no more than 1 1/8") tacking at the beginning

	and end of the seam. (This should be strongly emphasized to the student at this time). d. Open seams and press flat with hand iron.

Seam Type #1

1. Prepare material.	1. a. Instructor will use a piece of material 4" x 8" for demonstration. b. Place material on table face side up. c. Mark a straight line across the length of material 1½" from the edge of the 8" length. d. Mark a straight line across the length of material ½" from the same edge. e. At this point the markings should be straight and measurements accurate.
2. Sewing Seam Type #1	2. a. Fold material on mark made 1½" from edge. b. Fold material on mark made ½" from edge. c. Place material on the machine in such a manner that the folded edges are to the operator's left. d. Start at top of material 1/16" from the folded edge (½" edge) and stitch down the entire length of the material. e. The stitch line should have a 1" tacking stitch (no less than 7/8" or no more than 1 1/8") at each end. f. Press completed seam down flat with hand iron.

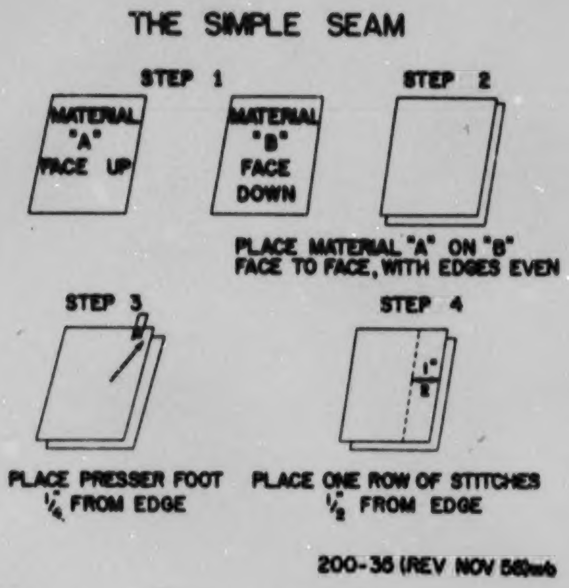

THE SIMPLE SEAM
STEP 1
MATERIAL "A" FACE UP
MATERIAL "B" FACE DOWN
STEP 2
PLACE MATERIAL "A" ON "B" FACE TO FACE, WITH EDGES EVEN
STEP 3
STEP 4
1/2"
PLACE PRESSER FOOT 1/4" FROM EDGE
PLACE ONE ROW OF STITCHES 1/2" FROM EDGE
200-36 (REV NOV 56)w/o

Figure 1

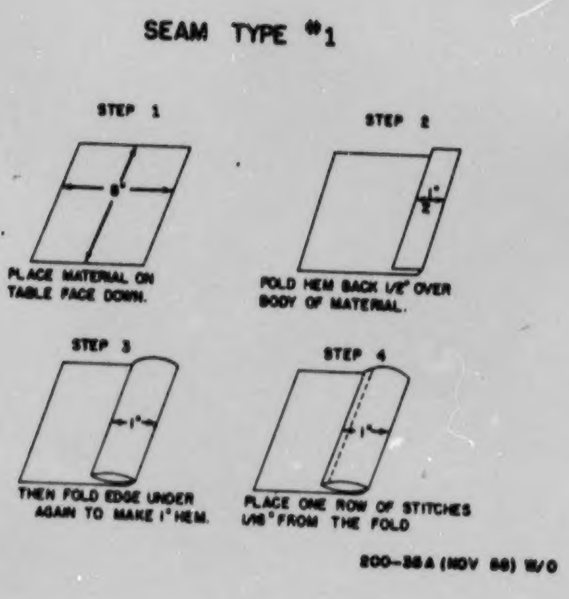

SEAM TYPE #1
STEP 1
8"
PLACE MATERIAL ON TABLE FACE DOWN.
STEP 2
1/2"
FOLD HEM BACK 1/2" OVER BODY OF MATERIAL.
STEP 3
1"
THEN FOLD EDGE UNDER AGAIN TO MAKE 1" HEM.
STEP 4
1"
PLACE ONE ROW OF STITCHES 1/16" FROM THE FOLD
200-36A (NOV 56) W/O

Figure 2

SECTION XXXI

SEAM TYPE #2

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the use and construction of Seam Type #2. During the last period of instruction, you learned that the characteristics of seams and stitching was an important factor to consider in the construction of the various types of seams. We will continue to give these considerations when constructing a seam such as seam type #2 and all other seams which we may be required to use.

2. As Textile Repairmen, during this phase of training, you must learn that a finished product is normally evaluated by its durability and appearance. During this training the instructor is not too concerned in your ability to produce a large quantity of constructed seams. What the instructor will be greatly concerned with, is your ability to construct a seam type containing all of the ingredients such as: durability, strength, and appearance.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the appropriate uses of seam type #2; given specially prepared 8 x 8 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to seam type #2, and performance standards, will distinguish between the face and the underside of the material, match the grain of both pieces of material and construct and tack seam type #2 to the satisfaction of minimal deviation standards established by the

School; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of Seam Type #2

Seam Type #2 is used in sewing plackets on to shirt sleeves. Also used to sew patch type pockets on shirts, jackets, and coats.

B. Construction of Seam Type #2

The important factors to remember from this period is to make all markings to the accurate measurements. The folds mentioned below should be even across the length of the material. The stitching should have all the qualities of appearance and durabilities.

1. Cut a piece of 8 x 8 inch material into two pieces 4" x 8".
2. Place the two pieces of material on table, face up.
3. Mark both pieces of material ½" from edge (on the 8" length) across length of material.
4. Fold under edge of one piece of material on ½" mark and place it on the marking on the second piece of material.
5. Place materials on machine and stitch down the entire length of material ¼" from the folded edge.
6. Stitch lines should be tacked at both ends with a 1" tack. (No less than 7/8" or no more than 1 1/8").
7. With hand iron press seam area flat.

C. Operator's Maintenance and Maintaining DA Form 2404.

1. It is the responsibility of you, the operator, to keep the sewing machine in a good operating condition at all times. This can only be accomplished by performing operator's maintenance as required.

2. Any and all discrepancies found will be recorded on DA Form 2404 "Equipment Inspection and Maintenance Worksheet".

SEAM TYPE #2

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate and explain the key points required in the construction of Seam Type #2. Anytime during the demonstration, you the student, are encouraged to ask questions of the instructor when in doubt of the performance steps being followed.

II. Study References:

TM 10-267 "General Repair for Clothing and Textiles"

Page 15, fig 13; pg 16, par d.

III. Supplies, Tools, and Equipment Required

Model 31-15 Sewing Machine (one per student)

Tailors tool kit (one set per student)

Thread (2 cones per student)

Material, salvage (ample supply)

IV. Directions to the Students

During the practical exercise, the student will follow the performance steps as outlined in paragraph VI, B. If at this time you have a question or in doubt of any portion of the practical exercise, do not hesitate to call upon your instructor for assistance.

V. Performance Standards

The performance standards listed in paragraph VI, A are established to enable the instructor to evaluate the students performance and inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor during and after your practical exercise are as follows:

1. Stitch lines straight and evenly spaced from edges across the length of material.
2. Stitch lines tacked at both ends (1" tack). No less than 7/8" and no more than 1 1/8".
3. Measurements used accurately (½" turn under).
4. Stitches properly formed (no loose or skipped stitches).
5. Seam material free of puckers.
6. Fold of seam even across the length of material, without any raw edges shown.

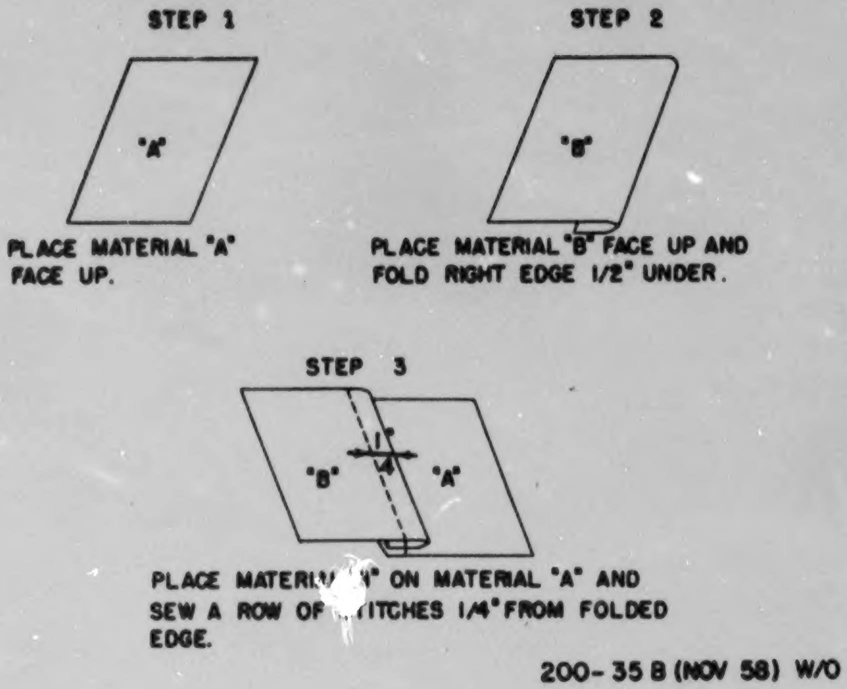
B. The procedures for constructing seam type #2 are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page.

Construction of Seam Type #2

1. Prepare Material.	1. a. Cut a piece of 8 x 8 inches of material in half, to 4 x 8 inches. b. Place the two pieces of material on the table, face up. c. Mark with tailors chalk a straight line parallel to and ½" from raw edge of both pieces of material (8" length edges). d. Make certain edges are trimmed evenly before marking. e. Markings should be accurate (½" from edges) and lines drawn straight across length of material.

2. **Sewing of Seam.**	2. a. Fold one piece of material on marked line, so that raw edge is under material. b. Place folded edge of material on marked line of second piece of material (the raw edge of the folded piece should be even with the raw edge of the bottom piece). c. Sew both pieces of material together with a straight row of stitches ¼" from folded edge. d. Stitching should be applied across the entire length of material (8" length). e. Seam should be tacked at beginning and end (1" tack). (No less than 7/8"; no more than 1 1/8"). f. Press seam area flat with hand iron.

SEAM TYPE #2



STEP 1

PLACE MATERIAL "A" FACE UP.

STEP 2

PLACE MATERIAL "B" FACE UP AND FOLD RIGHT EDGE 1/2" UNDER.

STEP 3

PLACE MATERIAL "B" ON MATERIAL "A" AND SEW A ROW OF STITCHES 1/4" FROM FOLDED EDGE.

200-35 B (NOV 58) W/O

Figure 3

SECTION XXXII

SEAM TYPE #3

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the various uses and construction procedures of Seam Type #3.

2. During the first hour of this subcourse, you were told that a combination of seams would be used to construct some of the various seams types. To construct Seam Type #3 two rows of stitching are required, a combination of the simple seam and seam type #1.

3. On the various types of clothing that you will become familiar with, you will find the construction of the seams also vary, either for the purpose of durability or appearance. When using the seam types for the repair and/or alterations of clothing, it is important that you apply the same type of seam that was used on the item of clothing at the time of construction.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the appropriate uses of seam type #3; given specially prepared 8 x 8 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to seam type #3, and performance standards, will distinguish between the face and the underside of the material, match the grain of both pieces of material, and construct and tack seam type #3 to the satisfaction of minimal deviations standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of Seam Type #3

Seam Type #3 is used in the replacement of worn out pocket flaps, joining coat seams, sewing right fly on trousers, and setting in pockets and sleeves on heavy garments.

B. Construction of Seam Type #3

1. Cut a piece of material into two pieces 4" x 8".
2. Place the two pieces of material on table face to face.
3. Mark the top piece of material ½" from edge (on the 8" edge) across the length of material.
4. Make certain both edges of the material (top and bottom pieces) are even at the marked edge.
5. Sew the two pieces of material together with a simple seam, following the markings made ½" from the edge.
6. Make certain the seam is tacked at both ends (1" tack). (No less than 7/8", no more than 1 1/8").
7. Fold top piece of material to the right, and sew a row of stitches ¼ inch to the right of the simple seam.
8. Tack both ends of the seam with a 1 inch tack.
9. Press seam area flat with hand iron.

C. Operators maintenance and maintaining DA Form 2404

1. The operator will lubricate all oil points as required. Shuttle race should be lubricated each time a new bobbin is inserted into the machine.
2. Any deficiencies will be recorded on DA Form 2404 "Equipment Inspection and Maintenance Worksheet", as required.

SEAM TYPE #3

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of Seam Type #3, followed by a practical exercise by the student. For the proper construction of seam type #3 the instructor will emphasize on the key points to be remembered during your practical exercise.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles"

Page 16, par e, fig 14.

III. Tools, Supplies, and Equipment Required

8 x 8 pieces of material (ample supply)

Tailors Tool Kit (1 set per student)

31-15 Sewing Machine (1 per student)

Thread (2 cones per machine)

IV. Directions to the student

Follow the step procedures outlined in paragraph VI, B. If during the practical exercise you have any questions or in doubt of step procedures, call on the instructor for assistance.

V. Performance Standards

The performance standards listed in paragraph VI, A are established by the school to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and that will be used by the instructor during the practical exercise and for grading purposes are as follows:

1. Top stitch line straight and evenly spaced (¼" from simple seam).

2. Stitch lines tacked at both ends (1" tack). The tack stitch should be no less than 7/8" or no more than 1 1/8".

3. Measurements used accurately (½" hemmed seams at back side of material).

4. Stitches properly formed (no loose or skipped stitches, lock of the stitch in center of the material, and length of stitch **12** to **14** per inch.

5. Seam free of puckers and even at the edges.

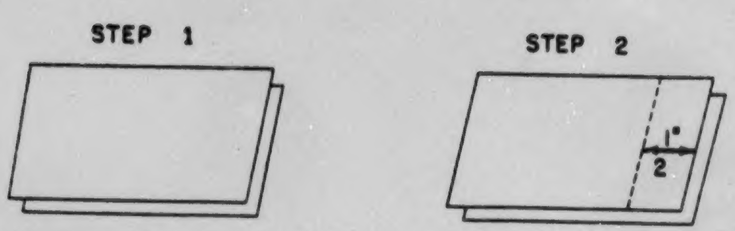
B. The procedures to be followed in the construction of seam type #3 are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page:

Construction of Seam Type #3

1. Prepare material.	1. a. Cut a piece of 8 x 8 inch material in half, to 4 x 8 inches. b. Place the two pieces of material on table, face to face. c. Mark the top piece of material ½" from edge (on the 8 inch edge) across the length of the material. d. Make certain the measurements are accurate and the markings straight and even.
2. Sewing of seam.	2. a. Place both pieces of material on machine (edges of material even and the markings up and to the operators right.) b. Sew both pieces of material together with a simple seam, following chalk mark made ½" from edge. c. Make certain the seam is tacked at both ends (1" tacking). (No less than 7/8", no more than 1 1/8").

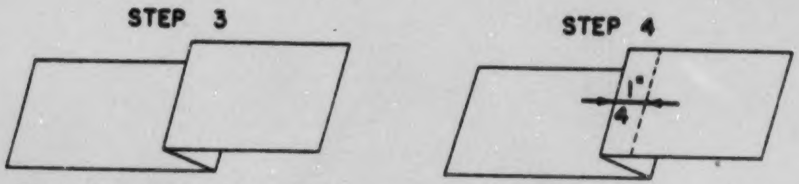
d. Fold top piece of material to the right. (Make certain that the ½" hemmed edges are also folded to the operators right.)
e. Sew a row of stitches ¼" to the right of the simple seam. (This row of stitches should join the right piece of material and the ½" hemmed edges together.)
f. Tack both ends of the seam with a 1" tack.
g. Press seam flat with a hand iron.

SEAM TYPE #3



PLACE TWO PIECES OF MATERIAL FACE TO FACE.

PLACE ONE ROW OF STITCHES 1/2" FROM EDGE.



FOLD THE TOP PIECE BACK AND TURN THE EDGES UNDERNEATH TOWARD THE RIGHT.

PLACE ONE ROW OF STITCHES 1/4" FROM THE FOLDED EDGE.

Figure 4

SECTION XXXIII

SEAM TYPE #4

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the uses and construction of seam type #4.

2. The last period of instructions you were told that the seams would vary in construction for the purpose of durability or appearance. This period will show that seam type #4, because of its characteristics and construction, will serve principally for durability.

3. Seam Type #4, because of its durability, is used in the construction of military or civilian work clothing. If you observe the seams on your utility trousers and shirts (fatigues) you will find that they are joined at the seams with seam type #4.

4. Like Seam Type #3, two rows of stitching are also used in the construction of Seam Type #4. The manner in which the material is folded adds additional strength to the seam. It will be the most difficult of all the seams to construct, therefore it will be necessary for you to give all your attention to the instructor during his presentation, and closely observe the demonstration in the construction of the seam type #4.

B. Objective

As a result of this instruction the student, given appropriate references, will be able to describe the appropriate uses of seam type #4; given specially prepared 8 x 10 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to seam type #4, and performance standards, will distinguish between the face and underside of the material, match the grain of both pieces of material, and construct and tack seam type #4 to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of Seam Type #4

Seam Type #4 is to join the front and backs of the shirts, utility; trouser, utility; side seams, and shoulder, and sleeve seams of khaki shirts. It is also used on raincoats and most items of field clothing and arctic type protective clothing.

B. Construction of Seam Type #4.

1. Cut a piece of 8 x 8 inch material into two pieces 4 x 8 inch.

2. Place the two pieces of material face up and side by side.

3. Mark piece of material on the left, ¼" from the right edge (8" length).

4. Material on the right will be marked ½" from the left edge (8" length).

5. Fold material on left ¼" mark and place it on the ½" mark of material on the right,

6. Sew a row of stitches 1/16" from folded edge of top material. Make certain to tack both ends of the seam.

7. Turn the joined materials over with back side of material up.

8. Mark ¼" from raw edge of joined seam.

9. Fold under ¼" at mark and stitch 1/16" from folded edge across the length of the material.

10. Tack at both ends of the seam with a 1" tack. (No more than 1 1/8", no less than 7/8").

11. It is important that the stitch lines are evenly spaced and straight. Each seam line should have a tack at each end, and no raw edges shown.

C. Operator's Maintenance and Maintaining DA Form 2404.

1. It is the responsibility of the operator to keep the sewing machine in a good operating condition at all times. This can only be accomplished by performing your daily inspection and operator's maintenance in accordance with operator's check list.

2. It is important that your machine be kept free of dirt and lint, and all oil points lubricated as required.

3. The student also has the responsibility to properly maintain DA Form 2404 "Equipment Inspection and Maintenance Worksheet."

SEAM TYPE #4

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of seam type #4. At this time the instructor will point out the key points to remember when constructing seam type #4. Following the demonstration, the student will perform a practical exercise in the construction of seam type #4.

II. Study Reference:

TM 10-267 "General Repair for Clothing and Textiles" Mar 63, page 16, par f, page 17, fig 15.

III. Supplies, Tools, and Equipment Required:

31-15 Sewing Machine (1 per student)

Tailors Tool Kit (1 set per student)

Material 8" x 8" (ample supply)

Thread (2 cones per student)

IV. Direction to students

Follow the step procedures outlined in paragraph VI, A. If during your practical exercise you are in doubt or have any questions, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards in paragraph VI, A are established to enable the instructor in checking the students performance during the practical exercise and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established by the school and which will be used by the instructor during and after the student practical exercise are as follows:

1. Stitch lines straight and evenly spaced across the length of material.

2. Stitch lines tacked at both ends of the seam with 1" tack. (No less than 7/8" or no more than 1 1/8").

3. Measurements used accurately, (¼" turned under at each edge).

4. Seam free of puckers and even at edges.

5. Stitches properly formed (no loose or skipped stitches, lock of stitch) in center of material, stitch lengths **12** to **14** per inch.

B. The performance steps for constructing seam type #4 are listed to the left of the page in the breakdown below. The key points which correspond in number to the procedure for each breakdown are listed to the right of the page.

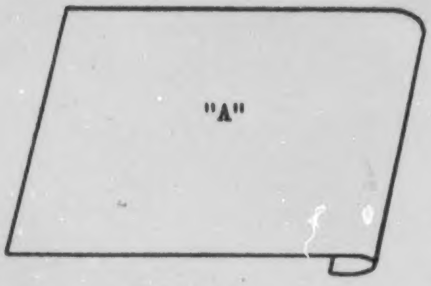
Construction of Seam Type #4

1. Prepare Material.	1. a. Cut a piece of material 8x8 inches into two pieces (4x8 inches). b. Edges must be cut straight and free of raveled edges. c. Place the two pieces of material on table face up and side by side. d. Material on left side will be marked ¼" from the right edge, (8" length). e. Material on right side will be marked ½" from the left edge. (Mark should extend across full length of material.) f. Make certain all markings are straight and evenly spaced on both pieces of material.

2. a. Material on left side will be folded on ¼" mark.
   b. Place the folded edge on the ½" marking on the right material.
   c. Sew a row of stitches 1/16" from folded edge. (Make certain to tack both ends of seam, 1" tack). No less than 7/8" or no more 1 1/8".
   d. Turn the joined materials over, back side up.
   e. Mark ¼" from edge of joined seam. (Mark across the length of the seam, straight and evenly spaced.)
   f. Fold material under at ¼" mark and stitch 1/16" from folded edge across length of material.
   g. Tack at both ends of the seam with a 1" tack. (No less than 7/8" or no more than 1 1/8").
   h. When properly constructed both sides of seam type #4 will have the same appearance.
   i. Press seam area with flat iron.

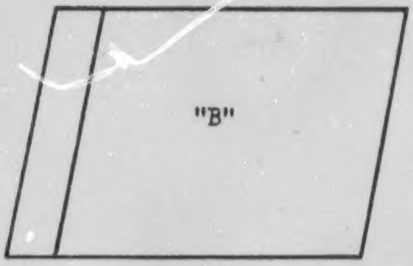
SEAM TYPE #4

Step 1



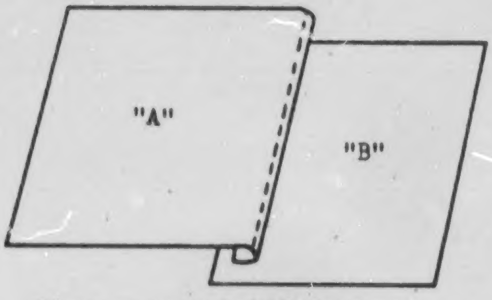
Place material "A" face up and fold right edge under ¼".

Step 2



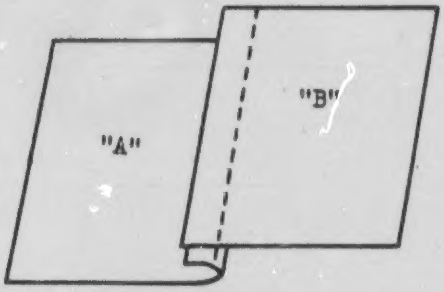
Place material "B" face up, and mark ½" from left edge with chalk.

Step 3



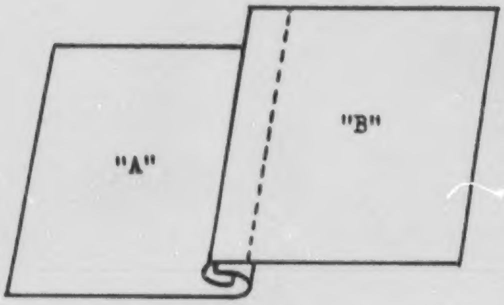
Place material "A" face up on ½" mark that was put on Material "B" and top stitch 1/16" from folded edge.

Step 4



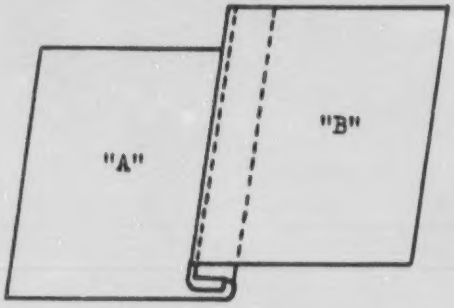
Turn material over face down.

Step 5



Fold edge of material "B" under ¼". (Interlook seams)

Step 6



Place a row of stitches 1/16" from the fold.

Figure 5

SECTION XXXIV

SEAM TYPE #5

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the uses and construction of Seam Type #5.

2. The last period of instruction you learned that seam type #4 was the most durable of all seam types because of its characteristics and construction. Seam Type #5 is similar in construction and must have a neat appearance because of its use.

3. In addition to work clothing, Seam Type #5 is also used in items of dress or Class "A" clothing. It is used to sew on some of the most predominent components to our clothing, such as collars and cuffs, therefore in the construction of seam type #5, when completed, it must have a neat appearance as well as strength and durability.

B. Objectives

As a result of this instruction the student, given appropriate references, will be able to describe the appropriate uses of seam type #5; given specially prepared 8x8 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to seam type #5 and performance standards, will distinguish between the face and the underside of the material, match the grain of both pieces of material, and construct and tack seam type #5 to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of Seam Type #5 - The primary use of Seam Type #5 is in the attachment of cuffs and/or collars to long sleeve shirts, khaki, poplin, and utility shirts (fatigues). It can also be used to sew sleeve facings on shirts.

B. Construction of Seam Type #5.

1. Cut a piece of 8 x 8 inch material into two pieces (4 x 8 inch).

2. Place both pieces of material on table face up, and squarely over each other.

3. Mark a line on the right side of material ½" from edge (8" length). Mark to be made on top piece of material.

4. Sew both pieces of material together following chalk mark with a simple seam. (Make certain edges of material are even, and seam tack at both ends).

5. Fold the bottom piece of material to the right, ½" seams up and also folded to the right.

6. Mark edge of right material ½" from edge (face side).

7. Fold edge of material on ½" markings. Fold material over in such a manner that the folded ½" edge overlaps the simple seam 1/8".

8. Sew a row of stitches 1/16" from the folded edge. Make certain to tack both ends of the seam (1" tack). No less than 7/8" or no more than 1 1/8".

9. Press seam area flat with hand iron.

C. Operators maintenance and maintaining DA Form 2404.

1. It is important that you perform operator's maintenance on your sewing machine daily. Use operators check list to properly inspect the entire

machine.

2. It is also the operators responsibility to maintain DA Form 2404, "Equipment Inspection and Maintenance Worksheet."

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SEAM TYPE #5

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of Seam Type #5. At this time the instructor will bring out the key points to remember in the construction of seam type #5. Following the demonstration by the instructor, the students will perform the practical exercise in the construction of seam type #5.

II. Study Reference

TM 10-267, "General Repair for Clothing and Textile"
page 18, fig 16; page 21, par g.

III. Tools, Supplies and Equipment Required:

8 x 8 pieces of material (ample supply)
Tailors tool kit (1 set per student)
31-15 sewing machine (1 per student)
Thread (2 cones per machine)

IV. Directions to Student

Follow the production steps outlined in paragraph VI, B. If during your practical exercise you have any questions or doubts, call on the instructor for assistance.

V. Performance Standards

The performance standards in paragraph VI, A are established to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used by the instructor during and after the student practical exercise are as follows:

1. Stitch lines tacked at both ends with 1" tack. (No less than 7/8" and no more than 1 1/8").

2. Stitch lines straight and evenly spaced across the length of the material (1/16" from folded edge).

3. Measurements used accurately ½" seams and raw edge turned under ½".

4. Stitches properly formed; no skipped stitches, lock of stitch in center of material, length of stitches, 14 to 16 stitches per inch.

5. Completed seam free of puckers, and even at edges.

B. The production steps for constructing seam type #5 are listed to the left of the page in the breakdown below. The key points which correspond in number to the production steps for each breakdown are listed to the right of the page.

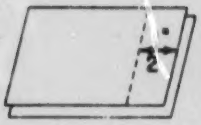
Constructing of Seam Type #5

1. Prepare material.	1. a. Cut a piece of 8x8 inch material into two pieces (4 x 8 inch). b. Place both pieces of material on table face up and squarely over each other. c. Mark a line across the top piece of material on the right edge, ½" from the raw edge. (8 inch length). d. Make certain marking measurements are accurate, and mark line straight across the length of material.

2. Sewing seam.	2. a. Sew both pieces of material together following chalk mark with a simple seam (make certain edges of material are even, and seams tacked at both ends). Tack to be no less than 7/8" or no more than 1 1/8". b. Fold the bottom piece of material to the right, seamed edges also folded to the right. c. Mark edge of right material ½" from edge (face side). d. Fold edge of material on ½" marking and fold the body of material in such a manner that the folded ½" edge overlaps the simple seam 1/8". e. Sew a row of stitches 1/16" from the folded edge. Make certain to tack both ends of seam (1" tack). No less than 7/8" or no more than 1 1/8". f. Press seam area flat with hand iron.

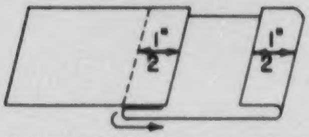
SEAM TYPE #5

STEP 1



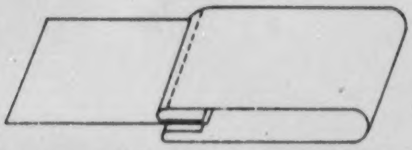
LAY BOTH MATERIALS FACE UP. PLACE A ROW OF STITCHES 1/2" FROM THE EDGE.

STEP 2



PULL BOTTOM PIECE OUT FLAT AND FOLD END OVER AND IN 1/2".

STEP 3



FOLD THE EDGE OF THE SECOND PIECE OF MATERIAL 1/2". LAY THE FOLDED EDGE JUST BEYOND THE FIRST STITCH. TOPSTITCH WITH ONE ROW OF STITCHES 1/16" FROM THE FOLD.

200-35 E (NOV 58) W/O

Figure 6

SECTION XXXV

SEAM TYPE #6

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the use and construction of Seam Type #6. This will be the last of the seam types to be constructed during this subcourse. Although there are several additional types of seams used in the construction of clothing, the seven seam types you learned during this phase of your training will enable you to make any or all of the authorized alterations and repairs required in the army.

2. During the first hour of instruction in machine sewing you were told of the characteristics of the various types of seams. We are certain this proved to be an important factor to you as you gradually progressed during this subcourse. In the future when you start to utilize the various seam types in the alteration and/or repair of clothing, you will understand more fully the importance of constructing a seam type that contains all of the ingredients to make a completed seam that will wear well, and have a neat appearance.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the appropriate uses of seam type #6; given specially prepared 8x8 inch pieces of material, tools, supplies, 31-15 sewing machine, measurements appropriate to seam type #6, and performance standards, will distinguish between the face and the underside of the material, match the grain of both pieces of material, and construct and tack seam type #6 to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of Seam Type #6 - Seam Type #6 is used to make edge finishings of cuffs, collars, pocket flaps, and to sew welts on side pockets.

B. Construction of Seam Type #6

1. Cut a piece of 8 x 8 inch material into two pieces (4x8 inch).

2. Place the two pieces squarely over each other, and face to face.

3. Mark 1/2" from the right edge, across the length of the material (8 inch length).

4. Make certain the marked edges are even.

5. Join the two pieces of material together by sewing with a simple seam. (Tack both ends of seam with 1" tacking stitch). No less than 7/8", not more than 1 1/8".

6. Fold bottom piece of material to the right and press seams open with hand iron.

7. Fold right material over the left piece of material. (At this point the simple seam is at the operator's right and top material face up).

8. Mark top material 1/4" from the right edge, (this is where the two materials are joined with a simple seam) across the length of material.

9. Sew a straight row of stitches following the chalk mark $\frac{1}{4}$" from right edge of both pieces of material. (Make certain stitching is straight and evenly spaced $\frac{1}{4}$" from the edge).

10. Seam should be tacked at both ends with a 1" tack. No less than 7/8", not more than 1 1/8".

11. Press seam area flat with hand iron.

C. Operator's Maintenance and Maintaining DA Form 2404. "Equipment Inspection and Maintenance Worksheet."

1. Throughout the course you will hear the instructor remind you of the operator's maintenance. This will be necessary, because if the machine does not receive proper maintenance, it will not operate properly and in due time will become inoperative.

2. It is also important that the DA Form 2404 be kept up to date, and all entries made correctly.

D. During the first hour of this subcourse, you were taught that the characteristics of a properly constructed seam or stitching are, strength elasticity, durability, security, and appearance. The end use of the item will govern the importance of these characteristics and the selection of the seam or stitching type should be based on these considerations.

E. The strength of the seam or stitching should equal that of the material it joins. The elements affecting the strength of a seam or stitching are:

1. Stitch type.
2. Thread strength.
3. Stitches per inch.
4. Thread tension.

F. The technique and skill of the sewing machine operators also govern the appearance of the seams and stitchings. Some of the factors which will affect the appearance of a seam are:

1. Loose stitches.
2. Poorly formed stitches.
3. Crowded stitches.
4. Crooked stitches.
5. Skipped stitches.
6. Puckers.
7. Raw edges exposed.

SEAM TYPE #6

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of seam type #6. At this time the instructor will bring out the key points to remember in the construction of seam type #6. Following the demonstration the students will perform the practical exercise in the construction of seam type #6.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles"

Page 19, fig 17; page 21, par h.

III. Tools, Supplies, and Equipment Required:

8 x 8 pieces of material (ample supply)
Tailors tool kit (1 set per student)
31-15 sewing machine (1 per student)
Thread (2 cones per machine)

IV. Directions to Students

Follow the production steps outlined in paragraph VI, B. If during your practical exercise you have any questions or doubts, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards in paragraph VI, A are established to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used by the instructor during and after the student practical exercise are as follows:

1. Stitch lines straight and evenly spaced from edges.

2. Stitch lines tacked at both ends (1" tack) no less than 7/8" or not more than 1 1/8".

3. Measurements used accurately (½" simple seam, ¼" top stitch from right edge).

4. Stitches properly formed (no loose or skipped stitches, and lock of stitch in center of material).

5. Seam material free of puckers.

6. Fold at right edge rolled properly with seam on the edge.

B. The performance steps for constructing seam type #6 are listed to the left of the page, in the breakdown below. The key points which correspond in number to the performance steps for each breakdown are listed to the right of the page.

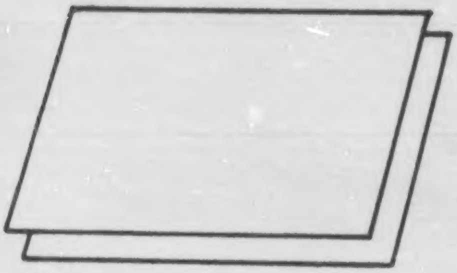
Construction of Seam Type #6

1. Prepare material.	1. a. Cut a piece of 8 x 8 inch material into two pieces (4 x 8 inch). b. Place the two pieces of material squarely over each other (face to face). c. Mark ½" from the right edge, across the length of material (8 inch length). d. Make certain line is straight and evenly spaced from the edges. e. Edges of the material should be neatly trimmed (right edge).

2. Sewing Seam.	2. a. Join the two pieces of material together by sewing with a simple seam. (Tack both ends of seam with a 1" tack). No less than 7/8" not more than 1 1/8". b. Fold bottom piece of material to the right (at this point the underside of the materials are shown up). c. Open the 1/2" seams and press flat with hand iron. d. Fold right piece of material over the left piece of material (at this point the simple seam is to the operators right and face of top material up). e. Mark top material ¼" from the right edge (simple seam) across the length of material. f. Sew a straight row of stitches following the chalk mark ¼" from right edge. (Make certain that the edges are rolled so that the seam is flushed on the right side). g. Tack seam at both ends with a 1" tack. h. Press seam area flat with hand iron.

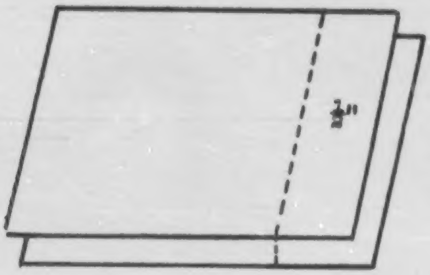
Step 1

Place two pieces of material face to face



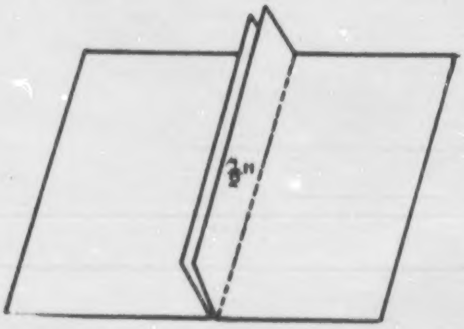
Step 2

Stitch with one row of stitches ½" from edges



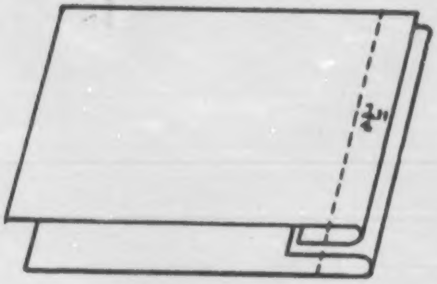
Step 3

Turn face down and roll out stitch flush



Step 4

Turn materials over back to back. Stitch with one row of stitches ¼" from the edge



SEAM TYPE #6

Figure 7

SECTION XXXVI

CONSTRUCTION OF ZIG-ZAG AND REINFORCED DARNS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the uses and construction of the zig-zag and reinforced darns.

2. This period begins another phase of machine sewing. It will include darns and patches which are normally used in the repair of clothing.

3. Like the seam types, the final results and appearance of a repair procedure will determine the serviceability and classfification of an item. Therefore every effort should be made by you as textile repairman, to make the repair procedures to items of clothing, so that the item will retain the necessary wear expectancy required.

B. Objectives

As a result of this instruction, the student, given appropriate references, will be able to describe the uses of the zig-zag and reinforced darns; given pieces of material, tools, supplies, 31-15 sewing machine, measurements, and performance standards appropriate to each darn, will distinguish between the face side and underside of the materials, match the grain of the materials, and construct the zig-zag and reinforced darn (top and bottom), to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Darning - Clothing and textiles with thin places or holes not larger than 7/8 inch in diameter are repaired by darning. When darning by machine, select thread that will match the item. Darning is done on the face side of the item.

B. Use and Construction of Zig-Zag Darn - The zig-zag darn is used to repair holes or breaks less than ½ inch in diameter, and a rip or tear where no material is missing.

1. To repair the small hole or break, stitch up and down across the hole. Make sure edges of hole lay flat and do not bunch up. Lines of stitches should be very close together, but not overlapped.

2. To repair the rip or tear, make an oblong mark ¼ inch from each side and end of rip. Using chalk mark as a guide, stitch back and forth across rip from one end to the other. Lines of stitches should be very close together and not extend beyond boundaries of chalk mark. Do not overlap rows of stitches.

C. Use and Construction of Reinforced Darn - Clothing and textiles with holes ½ to 7/8 inch in diameter are mended with a reinforced darn. This darn requires the use of a reinforcing piece of material that matches the item, and is applied by:

1. Placing reinforcing material on table face up.

2. Place damaged area of item face up, over reinforcing material, and sew a series of stitches in a zig-zag fashion over hole and through reinforcing material.

3. Turn item over so that it is face down, and trim reinforcing material close to the darning stitches (1/8 inch).

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CONSTRUCTION OF ZIG-ZAG AND REINFORCED DARNS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of the zig-zag and reinforced darns. At this time the instructor will emphasize on the key points to remember in the construction of the zig-zag and reinforced darns.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles."

Page 26, par a; page 29, fig 25; page 30, par c, e.

III. Tools, Supplies, and Equipment Required

4"x8" pieces of material (ample supply)

Tailors tool kit (1 set per student)

31-15 sewing machine (1 per student)

Thread (2 cones per machine)

IV. Directions to Students

Follow the performance steps outlined in paragraphs VI, B. If during your practical exercise you have any question or in doubt, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards in paragraph VI, A are established to enable the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards that will be used by the instructor during and after the student practical exercise are as follows.

1. No puckers of any nature should be visible on the darns.

2. Stitches should be uniform and 1/16" to approximately a needle's width apart throughout the darns.

3. Stitches should not overlap.

4. Check characteristics of stitches for the following:

   a. The lock of the stitch must be in the center of the material.

   b. There should not be any skipped stitches.

   c. There should be approximately 12-14 stitches per inch.

5. All measurements should be used accurately.

B. The performance steps for construction of the zig-zag and reinforced darns are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps for each breakdown are listed to the right of the page.

Zig-zag Darn

1. Preparing material.	1. a. Take a 4" x 8" piece of material and lay it face up on the table in a horizontal position. b. Measure 3" from each end of patch and draw lines. c. Lay ruler in a vertical position across material between the end measurements, and mark at the 2" line which should give you the center of material. d. Lay ruler in a horizontal position and draw a line from one end to the other end. Do not go beyond end lines. The line you draw should be 2" in length. e. Cut the 2" line (make a slit). f. Measure $\frac{1}{4}$" in all directions, around the 2" slit, and draw lines.

2. Sewing the Material.	2. a. Start sewing on the ¼" line at either end and across the slit until you reach the opposite end on the ¼" line. b. Keep stitches 1/16" apart. c. Do not sew beyond the ¼" chalk lines.

Reinforced Darn (Bottom)

1. Preparing the Material.	1. a. Take a 4" x 4" piece of material and lay it face up on table. b. Find the center of the 4" x 4" piece of material. Measure in 2" or draw diagonal lines from one corner to the other and where the lines cross is approximately the center of the material. c. Measure ½" from center completely around the patch, making a 1" square. Draw lines. d. Cut out the 1" square on the lines. Do not go beyond the 1" square lines. e. Measure and mark ¼" lines around hole. (This is sewing mark.)
2. Preparation of Reinforcement material.	2. a. Take a piece of like material and make it square. b. Center it under the 1" square hole. Making ½" lay over on all four sides. c. Place reinforcement material so face side shows up through the hole in the material. d. Pin the material and reinforcement together.
3. Sewing the Reinforced Darn (Bottom)	3. a. Check to make sure the reinforcement material is centered. b. Begin sewing on the ¼" chalk line and sew across hole. c. Make stitches approximately 1/16" apart. d. Do not go beyond the ¼" chalk lines. e. Sew from top side (face side). f. Turn patch over and trim 1/8" excess material off leaving 1/8" material remaining.

Reinforcement Darn (Top)

NOTE: Invert the procedures with reinforcement material on face side of garment. Reinforcement material is face up, and sewing is done from the top side.

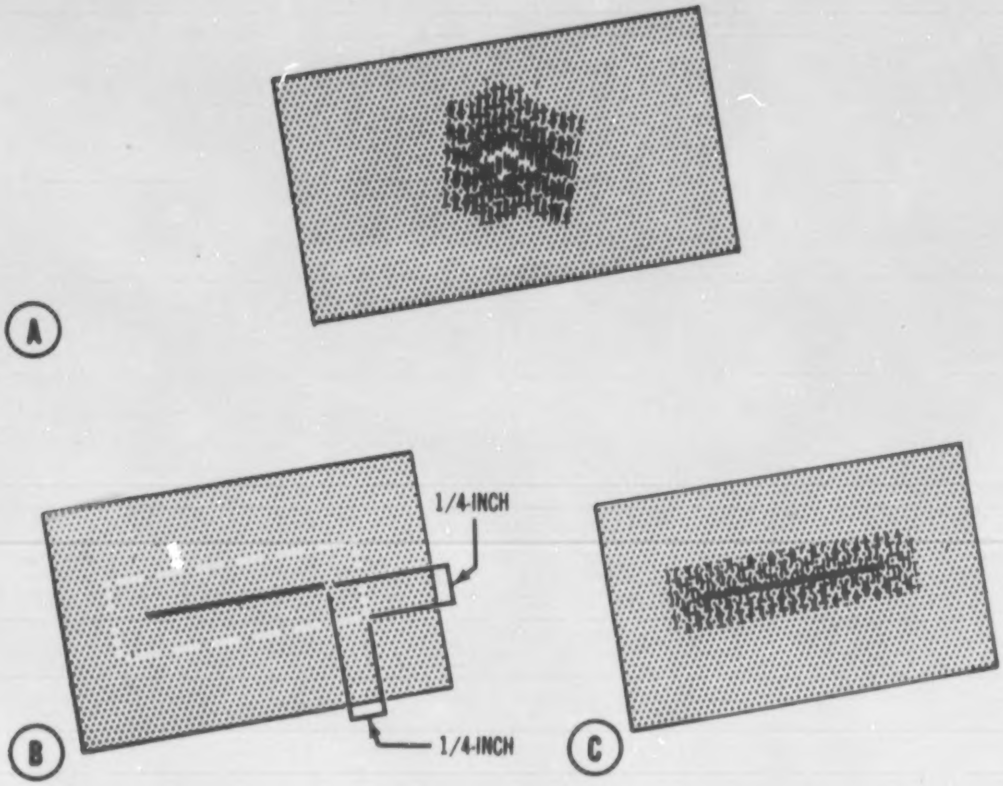
A
1/4-INCH
B
1/4-INCH
C

Figure 8 - *Zigzag darn.*

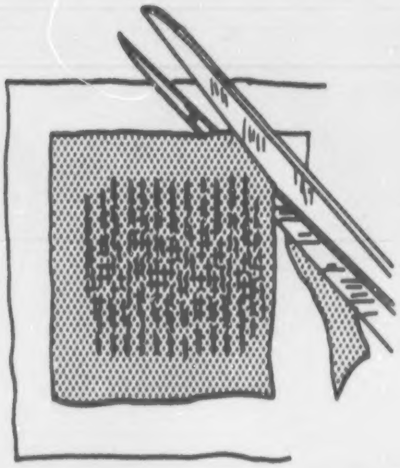

Figure 9 - *Reinforced darn.*

SECTION XXXVII

CONSTRUCTION OF SIMPLE TOP AND INVERTED PATCHES

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period of instructions the instructor will discuss the use and construction of the Simple Top and Inverted Patches.

2. The Simple Top and Inverted Patches are the first of three patches you will learn to construct. These patches are used in the repair of the various articles of clothing and textiles used throughout the services. As Clothing and Textile Repairmen it will be your duty to make repairs to these items by use of these various patches.

3. Like the seam types you have just completed, the patches also have a definite use. Items that have large holes, tears, or areas worn thin in the material, are repaired by patching.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the uses of the top and simple inverted patches; given pieces of material, tools, supplies, 31-15 sewing machine, measurements, and performance standards appropriate to each patch, will distinguish between the face side and underside of the material, match the grain of the patches with the material being patched, and construct and tack the simple top and simple inverted patches to the satisfaction of minimal deviation standards established by the school, given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

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II. Presentation

A. Items that have large holes, tears or areas worn thin in the material, are repaired by patching. This may be done with or without the use of additional material.

1. Simple patch (top). This patch is a piece of material that matches the item being repaired and is cut at least 2½ inches larger on all sides than the hole or damaged area to be covered. To apply this patch -

a. Place damaged area of item on table face up.

b. Center patch over damaged area, face up, so that grain of patch matches grain of item.

c. Turn edges of patch under ½ inch. Stitch 1/16 inch from, and all around, edge of patch. Tack not less than 7/8 inch or not more than 1 1/8".

d. Turn item over and cut out hole or damaged area so that it is square or rectangular.

e. Notch corners of damaged material to ½ inch.

f. Fold raw edges of notched material ½ inch and press. Turn item over and stitch 1/16 inch from, and all around, folded edges.

g. Tack not less than 7/8 inch and not more than 1 1/8 inch.

2. Simple Patch (Inverted). This patch is applied in the same manner as the simple patch (top) except that this patch is sewn to the underside of the item rather than the outside.

B. Operator's Maintenance and maintaining DA Form 2404 "Equipment Inspection and Maintenance Worksheet."

1. Your sewing machine should be lubricated as required. Make certain the shuttle race assembly is lubricated each time a new full bobbin is inserted.

2. Maintain DA Form 2404 "Inspection and Maintenance Worksheet."

NOTE: ORIGINAL PAGE 37.03 HAS BEEN OMITTED, BUT ALL MATERIAL IS INCLUDED.

CONSTRUCTION OF SIMPLE TOP AND INVERTED PATCHES

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of simple top and inverted patches. This will be followed by a practical exercise by the student. At this time the student should ask questions when in doubt.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles"

Page 24, par 13; page 25, fig 21.

III. Tools, Supplies, and Equipment Required

8 x 8 inch material (ample supply)

Tailors tool kit (1 per student)

31-15 sewing machine (1 per student)

Thread (2 cones per machine)

IV. Direction to Students

Follow the performance steps as outlined in paragraph VI, B. If you have any questions or doubt regarding this practical exercise, do not hesitate to call upon the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Stitch lines straight and evenly spaced, 1/16 inch from folded edges.

2. Stitch lines tacked not less than 7/8 inch and not more [illegible] 1 1/8 inch.

3. Corners notched properly, no raw edges visible.

4. Measurements used accurately (½ inch turned under at edges).

5. Patch material free of puckers, and centered over damaged area.

6. Stitches properly formed (no loose or skipped stitches, lock of stitch in center of material, and length of stitches **12** to **14** per inch).

B. The performance steps for constructing the simple patch are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps are listed to the right of the page.

Construction of Simple Patch (Top)

1. Prepare Material.	1. a. Place two pieces of material on a table 8 x 8 inches, face up. b. Mark one piece of material ½ inch from the edges, all around the material. (Marked line should be straight and evenly spaced from edges.) c. Center the marked material over the second piece of material 8 x 8 inch (both pieces at this point are face up.) d. Fold under the marked edges of the top material (½ inch mark).
2. Sewing Patch.	2. a. Sew a row of stitches 1/16 inch from the folded edges all around the patch. (Make certain that the top piece of material is sewn centered over the bottom piece. b. Tack with a 1 inch tacking stitch. No less than 7/8" not more than 1 1/8". c. Turn the two pieces over, underside up.

d. From the stitch line of material, mark down towards center of material 1½ inch from all four sides forming a square.

e. Mark ½ inch from the marked square and towards center of material to form a smaller square.

f. Cut out the damaged area (at mark made 2 inch from stitch line).

g. Notch at all four corners of the cut out square.

h. Turn under the raw edge of the cut out square and press down material flat.

i. Stitch all around the folded edges 1/16 inch from the fold.

j. Tack the stitch line with a 1" tack. No less than 7/8" not more than 1 1/8".

k. Press patch flat with hand iron.

Construction Simple Patch (Inverted).	This patch is applied in the same manner as the Simple Patch (Top) except that this patch is sewn to the underside of the material rather than the face side.

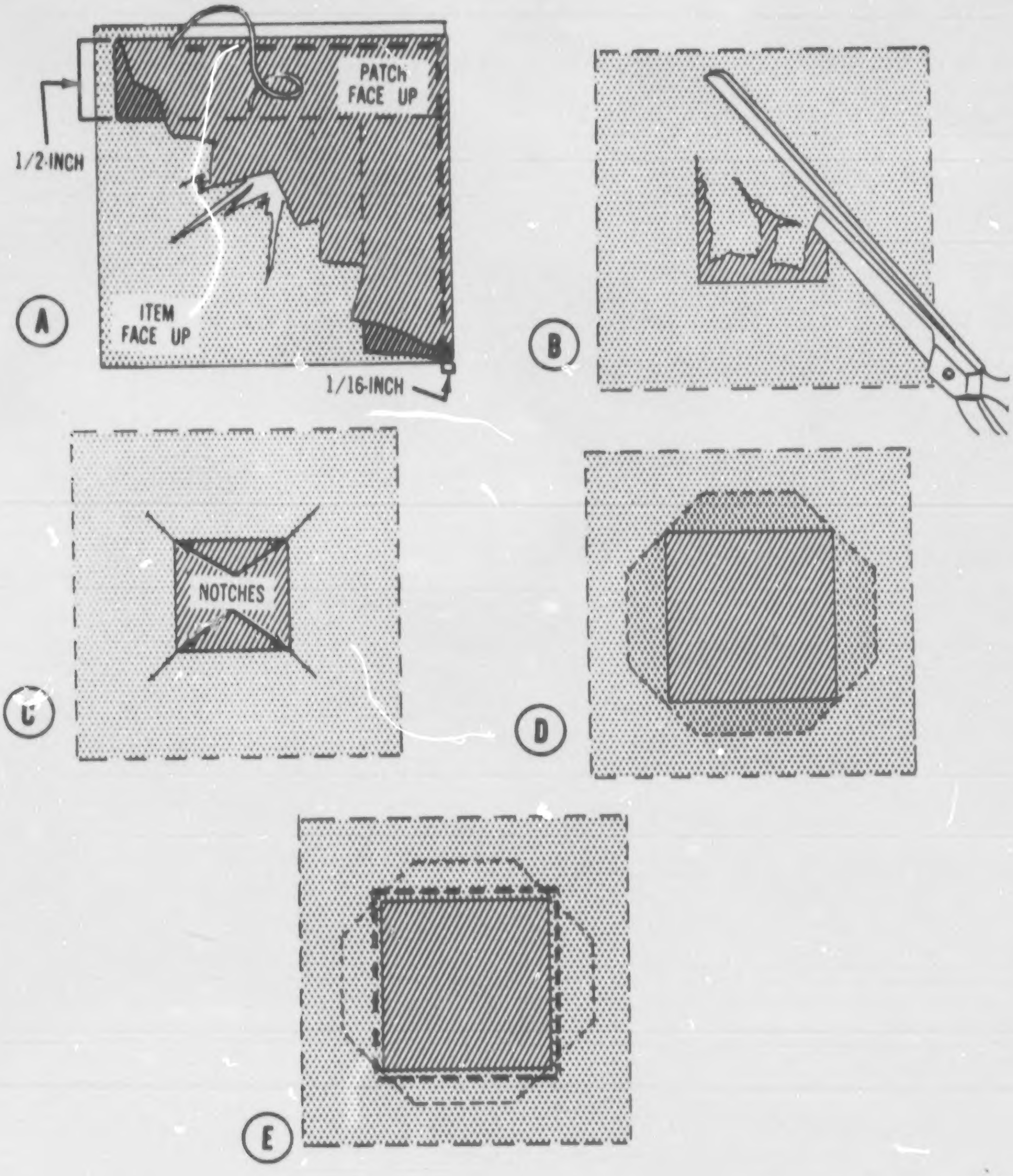
PATCH FACE UP
1/2-INCH
ITEM FACE UP
A
1/16-INCH
B
NOTCHES
C
D
E

Figure 10 - *Simple patch (top).*

SECTION XXXVIII

CONSTRUCTION OF THE "T" PATCH

PRECIS

I. Introduction

A. Orientation and Motivation

During this period the instructor will discuss the use and construction of the "T" Patch. This will be one type of repair that can be performed without patching material. It is called a "T" patch because of its shape. This type of damage usually is caused by a snag from a nail, wire or other sharp object resulting in a rip or tear to the garment.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the uses of the "T" patch; given pieces of material, tools, supplies, 31-15 sewing machine, measurements, and performance standards appropriate to the "T" patch, will construct and tack the "T" patch to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of "T" patch. The "T" patch is used to repair right-angled or L-shaped tears.

B. Construction of "T" patch.

1. Enlarge, by cutting, the L-shaped tear so that it forms an inverted T.

2. Place item on table, face up, so that the T is inverted. Fold right edge of material to the left along the vertical tear.

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3. Sew a row of stitches, beginning 1 inch above end of vertical tear at edge of fold, and continue to horizontal tear ending stitches ½ inch from edge of vertical tear. Tack seam at beginning and end.

4. Rotate item to the left ¼ turn so that horizontal tear is now vertical. Fold right edge of material to the left along horizontal tear.

5. Sew a row of stitches, beginning 1 inch above end of horizontal tear at edge of fold, and continue to juncture of vertical tear, so that seam at this point, is ½ inch from edge of horizontal tear. Continue sewing until row of stitches ends 1 inch below bottom end of tear at edge of fold. Tack seam at beginning and end.

6. Turn item over so that face side is down. Spread edges of tears away from seams, and press.

7. Turn item over so that face side is up, and sew a row of stitches 1/16 inch from and around seams. Tack row of stitches at beginning and end.

CONSTRUCTION OF "T" PATCH

PRACTICAL EXERCISE

I. Introduction

During this period the instructor will demonstrate the construction of the "T" patch. This will be followed by a practical exercise by the student. At this time the student should ask questions when in doubt.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles"

Page 26, par 13, fig 23.

III. Tools, Supplies and Equipment Required

8 x 8 inch material (ample supply)

Tailors tool kit (1 set per student)

31-15 sewing machine (1 per student)

Thread (2 cones per machine)

IV. Directions to Students

Follow the performance steps as outlined in paragraph VI, B. If you have any questions or doubts regarding this practical exercise, do not hesitate to call upon the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. The seams of the completed patch should be on the underside of the material, pressed open, and secured with a 1/16 inch top stitch.

2. No puckers of any nature should be visible on the patch.

3. The top stitch should be evenly spaced from the seams and around the entire T shaped patch.

4. Simple seams and top stitch should be tacked 1 inch (can deviate 1/8 inch plus or minus).

5. Stitches properly formed, (lock of stitch in center of material, no skipped stitches, approximately 12-14 stitches per inch.)

B. The performance steps for constructing the "T" patch are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps are listed to the right of the page.

Constructing the "T" Patch

1. Cut a "T" shape slit in an 8" x 8" piece of material.	1. a. Extend horizontal "L" slit into "T". b. Extend slit same length as opposite side.

Tear found in garment.   Shape tear into "T" shape.

2. Fold together and sew $\frac{1}{4}$" simple seam on vertical cut.	2. a. Fold material in half along the vertical slit. (Face to face). b. Sew $\frac{1}{4}$" simple seam along vertical slit. c. Make a 1" tack at the beginning and end of simple seam. Tack no less than 7/8" and no more than 1 1/8".

3. Join horizontal slit with a simple seam.	3. a. Fold material in half along horizontal cut. (Face to face.) b. Sew ¼" simple seam along horizontal slit. c. Be sure to taper the stitch line from zero inches at each end to ¼" along outer portion of slit. d. Tack both ends. (Not less than 7/8" and no more than 1 1/8" long.) e. Turn patch over (face down) and open seam.
4. Top stitch 1/16" around "T".	4. a. Insert needle at any point right side of vertical seam. Stitch 1/16" from the simple seam, and completely around the "T". b. Tack end of stitching (no less than 7/8" and no more than 1 1/8").

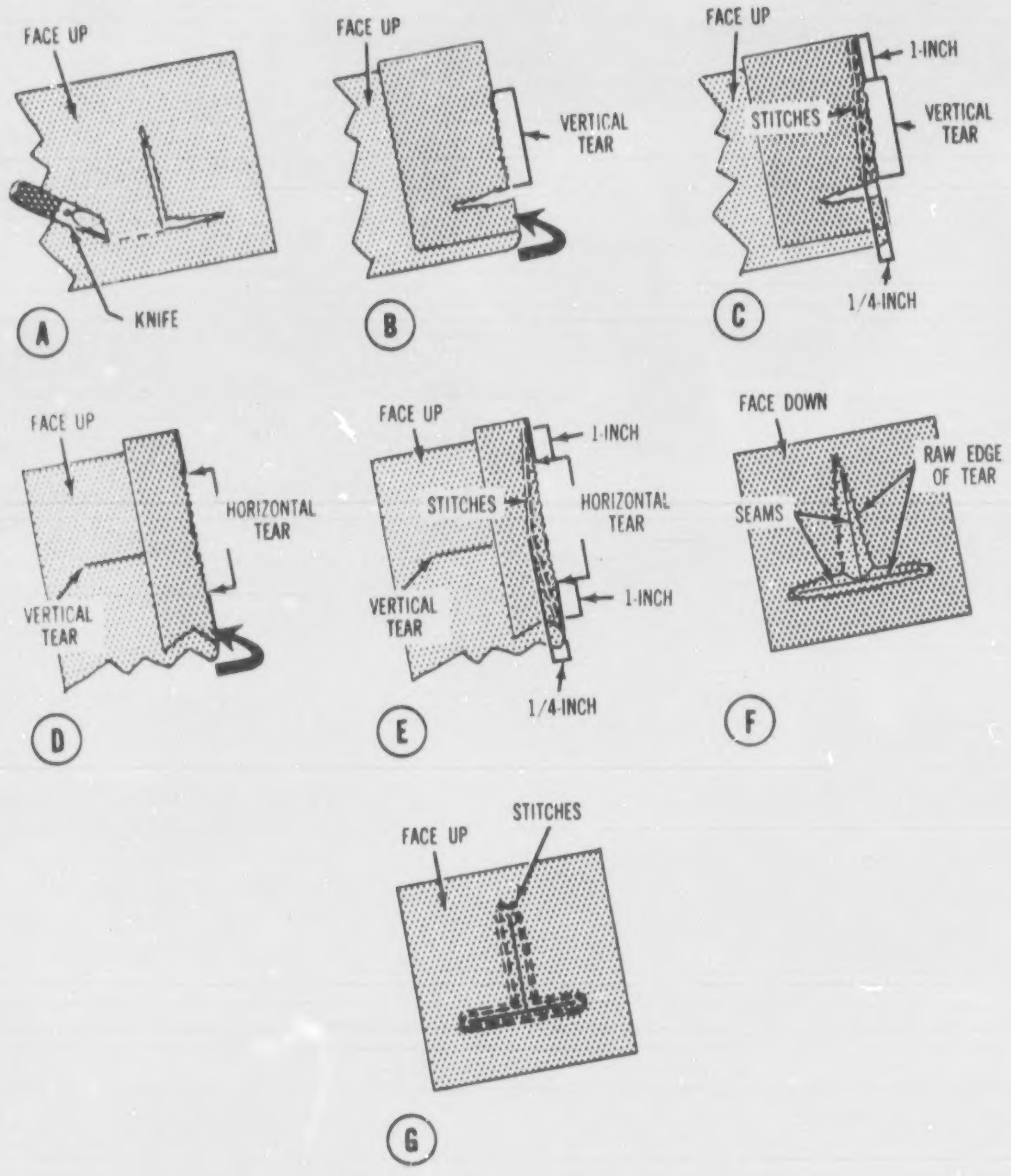
FACE UP
KNIFE
A
FACE UP
VERTICAL TEAR
B
FACE UP
1-INCH
STITCHES
VERTICAL TEAR
1/4-INCH
C
FACE UP
HORIZONTAL TEAR
VERTICAL TEAR
D
FACE UP
1-INCH
STITCHES
HORIZONTAL TEAR
VERTICAL TEAR
1-INCH
1/4-INCH
E
FACE DOWN
RAW EDGE OF TEAR
SEAMS
F
FACE UP
STITCHES
G

Figure 11 - *T-patch.*

SECTION XXXIX

CONSTRUCTION OF THE SET-IN PATCH

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the use and construction of the set-in patch. The set-in patch as the name implies, is constructed by sewing the material flush into the garment, rather than on or under the garment, therefore having an even surface.

2. When a properly constructed set-in patch when a matching material is used, it is difficult to distinguish the patch in the garment. It has a much neater appearance of the three different patches you will learn to construct.

3. Again at this point the instructor will not be concerned on the number of patches than you can construct. The primary interest of the instructor will be your ability to follow the proper procedures, your workmanship, and appearance of the finished patch.

B. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the uses of the set-in patch; given pieces of material, tools, supplies, 31-15 sewing machine, measurements, and performance standards appropriate to the set-in patch, will distinguish between the face side and underside of the materials, match the grain of the patching material with that of the material being patched, and construct and tack the set-in patch to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use of set-in patch - The set-in patch is used for the repair of clothing and textile items that have a large hole, tears, and areas worn thin in the material. The set-in patch is a piece of material sewn into the item rather than on or under the item. It is used when a neater appearance is required.

B. Construction of the set-in patch

1. Place two pieces of material on table face up. Material should measure 8 x 8 inches.

2. Mark materials "A" and "B". Material "A" represents the damaged area. Material "B" represents the patch.

3. On material "A" cut out a four inch square from the center of material. This is done by marking 2 inches from all edges of the material, and mark off a square. Allow ½ inch for seaming purpose.

4. Notch all four corners of the square at a 45 degree angle.

5. Place and center material "A" over material "B". All four edges of the materials should be even. (Materials face up.)

6. Starting on the right side of the materials, fold under the notched seams of material "A" in such a manner that the seam is to the operators right and the body of the material to the operators left. At this point the right side of material "A", the underside, is shown up.

7. Start at the upper portion of the notched seam and sew down to the bottom notch. Beginning and end of stitch line should be one stitch length in from the corner of notch. (This will prevent any raw edge from

showing when completed.)

8. Continue to sew the remaining three (3) edges of material "A" to material "B" in the same manner as shown in paragraph 7 above.

9. Cut and trim excess material from material "B" to coincide with the edges of seams on material "A".

10. Turn materials flat, underside up and open seams. For best results use hand iron to press open.

11. Turn materials over face side up, starting on the right side of material "A" and 1/16 inch from the seam line, stitch a row of stitches around the square.

12. When reaching the starting point of the stitch line, cross over the seam line the length of two stitches to material "B", continue the second stitch line around the square 1/16 inch from seam. Make certain to tack with 1" tack at end of stitch line.

13. Press the completed set-in patch with hand iron at rear of classroom.

14. During the construction of the set-in patch, it is important that the stitch rows be applied straight, a slight curving of the stitch lines, will cause the materials to pull or pucker when completed.

C. Operators maintenance and maintaining DA Form 2404, "Equipment Inspection and Maintenance Worksheet."

1. It is your responsibility to properly perform maintenance of the sewing machine to keep it in a good operating condition. This can be accomplished, by taking time, before, during and after each day of operation.

2. As the operator, you should make every adjustment as required, check all moving parts for its condition, lubricate the machine as required, and maintain DA Form 2404, "Equipment Inspection and Maintenance Worksheet."

NOTE: ORIGINAL PAGE 39.04 HAS BEEN OMITTED, HOWEVER ALL MATERIAL IS INCLUDED.

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CONSTRUCTION OF SET-IN PATCH

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of the set-in patch. Following the demonstration the student will perform a practical exercise in the construction of the set-in patch. At this time the student is encouraged to ask questions when in doubt.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles,"

Page 26, par 3; Page 27, fig 22.

III. Tools, Supplies, and Equipment Required

8 x 8 inch material (ample supply)

Tailors Tool Kit (1 set per student)

31-15 sewing machine (1 per student)

Thread (2 cones per machine)

IV. Direction to Students

Follow the performance steps as outlined in paragraph VI, B. If you have any questions or doubts regarding this practical exercise, do not hesitate to call upon the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Stitch lines straight and evenly spaced, 1/16 inch from seam line.

2. Stitch lines tacked no less than 7/8 inch not more than 1 1/8 inch.

3. Center patch 4 inch square.

4. Corners notched properly, no raw edges shown, or open corners visible.

5. Measurements used accurately ½ inch seams on the underside material.

6. Patch materials free of puckers.

7. Stitches properly formed (no loose or skipped stitches, lock of stitch in center of material, and length of stitches 12 to 14 per inch.)

B. The performance steps for constructing the set-in patch are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps are listed to the right of the page.

Construction of Set-in Patch

1. Prepare material.	1. a. Place two pieces of material on table, 8 x 8 inch, and face up. b. Mark materials as "A" and "B". (Material "A" represents damaged area, material "B" represents the patching material). c. Mark a four inch square in center of material, this is accomplished by marking in 2 inches from all edges of material "A", and mark off the square. d. From the marked square allow ½ inch for seaming purpose, and cut out the squared area. e. Notch all four corners of the cut out square at a 45 degree angle. f. Place and center material "A" squarely over material "B" (face up).

2. Sewing the Set-in Patch.

2. a. Starting on the right side of materials fold under the notched seams of material "A" to the body of the material to the left (at this time the right side of material "A" the underside is shown up).

b. Start at upper portion of the notched seam and sew down to the bottom notch (at starting point and at notches the stitch line should be one stitch length in from corner of notch, this will prevent any raw edges or open corners from showing when completed.)

c. Continue to sew the remaining three edges of material "A" to material "B" in the same manner as shown in paragraph b above.

d. Cut and trim excess material from material "B" to coincide with the edges of seams on material "A".

e. Turn materials over (underside shown up), and open seams with hand iron.

f. Place materials on machine face up. Start on the right side of material "A" and 1/16 inch from the seam line, stitch a row of stitches all around the square and 1 inch below starting point.

g. Keeping the needle into the material cross over the seam line two stitch lengths to material "B", continue the second stitch line around the square 1/16 inch from seam line. (Make certain to tack end of stitch line with one inch tack). No less than 7/8 inch not more than 1 1/8 inch.

h. Press the completed set-in patch with hand iron.

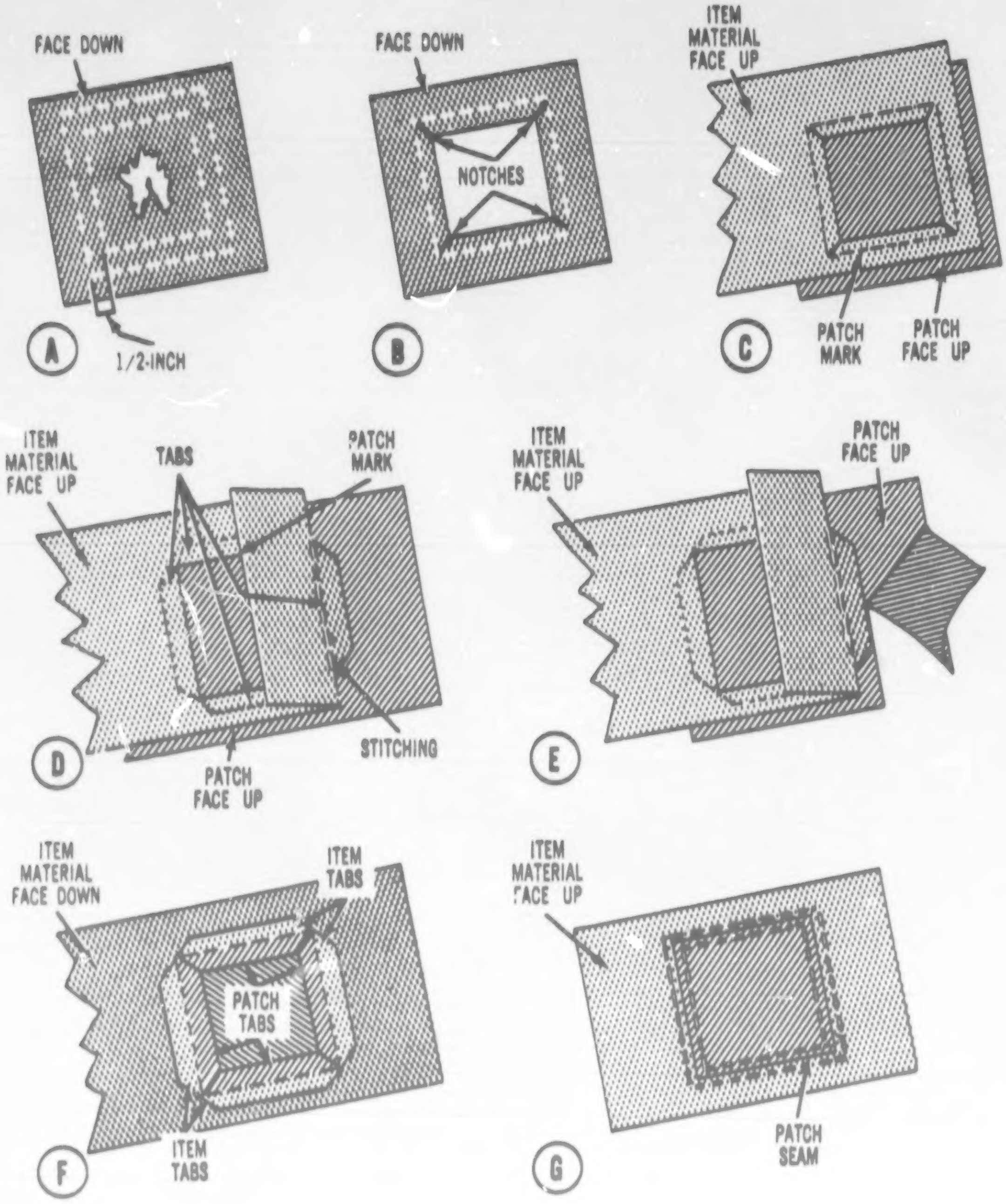

FACE DOWN
1/2-INCH
A
FACE DOWN
NOTCHES
B
ITEM MATERIAL FACE UP
PATCH MARK
PATCH FACE UP
C
ITEM MATERIAL FACE UP
TABS
PATCH MARK
STITCHING
PATCH FACE UP
D
ITEM MATERIAL FACE UP
PATCH FACE UP
E
ITEM MATERIAL FACE DOWN
ITEM TABS
PATCH TABS
ITEM TABS
F
ITEM MATERIAL FACE UP
PATCH SEAM
G

Figure 12 - *Set-in patch.*

SECTION XXXX

CONSTRUCTION OF THE "PINCH-PATCH"

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the use and construction of the "pinch-patch." This period completes the last of the patches and seam types that will be used in the repair and/or alterations of clothing.

2. Throughout the duration of the course you will be continuously reminded, that as clothing and textile repairmen, your responsibility will be to maintain those items of clothing and textile that provide our military personnel the maximum comfort, in the best state of repair as possible. Any item that loses its original value because of rips or tears, brings discomfort to the person who has to use it. It is your duty to repair these items soon after they have been damaged, as possible.

II. Objective

As a result of this instruction, the student, given appropriate references, will be able to describe the use of the "pinch-patch" given pieces of 8 x 8 inch material, tools, supplies, 31-15 sewing machine, measurements and performance standards appropriate to the "pinch-patch", will distinguish between the face side and underside of the patching material, construct and tack the "pinch-patch" to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Use and construction of "Pinch-Patch."

1. Use of Pinch Patch.

The pinch patch is designed primarily for use on feather filled items such as the comforter type field sleeping bag. This method of patching allows us to repair the item without removing any of the feathers or taking the bag apart at the seams. The pinch patch can also be used in the repair of the heavy artic type clothing.

2. Construction of the Pinch Patch.

a. Prepare material.

(1) Select two pieces of material 8x8 inch square.

(2) Cut one piece of material to 4x4 inch square.

(3) Measure and mark a 3 inch square in the larger piece of material (8x8" square). This is accomplished by measuring in from all sides of the material 2½ inches.

(4) Measure and mark ½ inch from all sides of the material (4x4 inch square).

(5) Fold and press down with hand iron, all four sides of the 4 x 4 inch material on the ½ inch mark. When completed, the material will measure 3x3 inch square.

(6) Place and pin the 3x3 inch material in the marked square of the 8x8 inch material. Folded edges of the 3x3 inch material should be in line with the marked square.

b. Sewing Pinch Patch.

(1) Start at the right edge of the patch at the upper right corner.

(2) Pinch and fold the material on the 8x8 inch square in such a manner that the fold is flush with the folded edge of the 3x3 inch material.

(3) Place the materials in machine and under presser-foot so that the materials are folded to operator's left.

(4) Stitch down along the folded edges the length of the patch being applied (1/16 inch from the folds).

(5) Turn and fold materials in such a manner so as to sew across the bottom edges of the patch.

(6) Continue around the patch in the same procedure described in (1) thru (5) above. Sew to the starting point and one inch below starting for tacking purpose.

B. Operator's Maintenance and Maintaining DA Form 2404. "Equipment Inspection and Maintenance Worksheet."

1. During previous hours of instructions you learned the importance of operator's preventive maintenance services. During this period you will be using the sewing machine constantly. It will be your responsibility to keep the sewing machine in a satisfactory operating condition. This can only be accomplished by applying these services and lubricating the machines as required.

2. Make certain to record all deficiencies and corrective action on DA Form 2404, "Equipment Inspection and Maintenance Worksheet."

CONSTRUCTION OF THE "PINCH-PATCH"

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction of the "pinch-patch". Following the instructor's demonstration the student will perform a practical exercise in the construction of the "pinch-patch." At this time the student is encouraged to ask questions when in doubt.

II. Study Reference

Student Workbook

III. Tools, Supplies, and Equipment Required

8x8 inch material (ample supply)

Tailors Tool Kit (1 set per student)

31-15 sewing machine (1 per student)

Thread (2 cones per machine)

IV. Direction to Students

Follow the performance steps as outlined in paragraph VI, B. If you have any questions or doubts regarding this practical exercise, do not hesitate to call upon the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student performance and inspecting the final results of your practical exercise for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Proper measurements and markings made (patch 3x3 inch square and centered in the 8x8 inch material).

2. Stitch line tacked (no less than 7/8 inch and not more than 1 1/8 inch) at the starting point.

3. Stitch line straight and stitches formed properly (lock of stitch in center of material, no skipped stitches, length of stitch 12 to 14 stitches per inch).

4. Stitch line applied 1/16 inch from the folded edges.

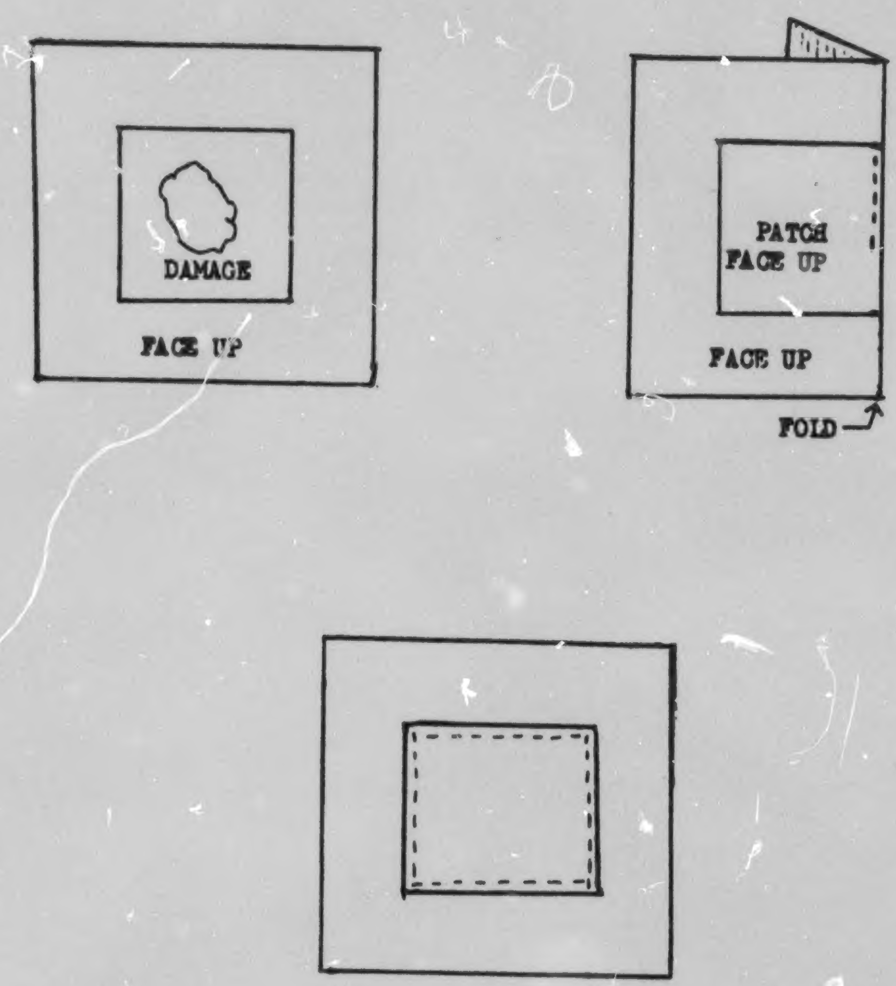
B. The performance steps for constructing the "pinch-patch" are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps are listed to the right of the page.

Construction of the "Pinch Patch".

1. Prepare material.	1. a. Select two pieces of material 8x8 inch square. b. Cut one piece of material to 4x4" square. c. Measure and mark a 3 inch square in the center of the larger piece of material (8x8). This is accomplished by measuring and marking in from all sides of the material 2½ inches. d. Measure and mark ½ inch from edges of material on all four sides of the 4x4 inch material. e. Fold and press down with hand iron, all four sides of the 4x4 inch material on the ½ inch mark. When completed the material will measure 3x3 inch square. f. Place and pin the 3x3" material in the marked square of the 8x8" material. Folded edges of the 3x3" material should be in line with the marked square.

2. Sewing Pinch Patch.

2. a. Start at the right edge of the patch in the upper right corner.
   b. Pinch and fold the material of the 8x8" square, on the marked line in such a manner that the fold is even or flush with the folded edge of the 3x3" material.
   c. Place the materials in machine and under the presserfoot so that the materials are folded to the operator's left.
   d. Stitch along the folded edges (1/16" from the folds) and down the length of the 3" patch. Leave needle in material.
   e. Turn and fold materials in such a manner so as to sew across the bottom edges of the patch.
   f. Continue to sew around the patch following the procedures described in b-e. above. Sew to the starting point and one inch below for tacking.


DAMAGE
FACE UP
PATCH
FACE UP
FACE UP
FOLD

PINCH-PATCH

Figure 13

SECTION XXXXI

SHORTENING SLEEVES ON UTILITY JACKETS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss methods and procedures followed in shortening of sleeves on the utility jacket. This will include measuring and marking at the desired length, ripping the old hem, cutting off the excess material, and sewing a new hem.

2. To shorten sleeves on the utility jacket not only will offer the individual comfort, it will also extend the wear expectancy of the garment. Sleeves that may be too long for an individual can also be a safety hazard, particularly if working around machinery.

II. Objective

As a result of this instruction, the student, given used utility jackets, yardstick, tailor's chalk, measurements appropriate to desired length and hem width allowances, and appropriate performance standards, will measure and mark jacket to a specific given length, and measure and mark appropriate hem allowance; given a ripper and scissors, will rip out old hem and trim off excess material; given appropriate references, 31-15 sewing machine, and supplies, will fold and sew new to the satisfaction of minimal deviation standard established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Seam Type used - The seam type to be used when shortening sleeves on utility jacket will be seam type #1.

B. Measuring and Marking

1. When taking measurements for the desired length, make certain that the measurements are correct. Improper measurements can result in improper length of the sleeves (too long, or too short).

2. When markings are made for the desired length, make certain the marks are even and straight. If properly marked, you can be certain that the final results of the alteration will be free of errors.

C. Ripping stitches from old hem.

1. Use a ripper and cut out all the old stitches from the hem.

2. It is important that you use and handle the ripper in the correct manner. This will prevent damage to the garment and also a safety precaution.

D. Sewing the new hem

1. Make certain the hem is folded on the correct markings before sewing the new hem.

2. Sew straight and even when applying a new hem.

3. Tack the row of stitches with a 1 inch tack and stay within the minimal deviation standard.

4. When making an alteration to the utility jacket, keep within the minimal deviation standards established by the school.

E. Operator's maintenance and maintaining DA Form 2404.

1. It is important that you perform operator's preventive maintenance services on your machine.

2. Keep the DA Form 2404 up to date, this is the machine's historical record. All information is extracted and recorded to the machine's permanent record.

SHORTENING SLEEVES ON UTILITY JACKET

PRACTICAL EXERCISE

I. Introduction

During this practical exercise, the instructor will demonstrate the proper procedure in shortening sleeves on utility jackets. Students will perform a practical exercise on the alteration of the jacket sleeve. At this time the student should ask questions when in doubt.

II. Study Reference

AR 700-8400-1, "Issue and Sale of Personal Clothing", page 41,
paragraph 48.

TM 10-267, "General Repair for Clothing and Textiles", Page 13,
paragraph 9C.

III. Tools, Supplies and Equipment Required

Tailor's kit (1 set per student)

31-15 sewing machine (1 per machine)

Salvaged utility jackets (ample supply)

Thread (2 cones per machine)

IV. Direction to student

Follow the performance steps as outlined in paragraph VI, B. If you have any questions or doubts regarding this practical exercise, do not hesitate to call upon the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the students performance and inspecting the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Sleeves shortened at the desired length as directed.
2. Hem one inch wide
3. $\frac{1}{2}$ inch turn under allowance.
4. Tack to be made on the inside seam of the sleeve (length of tack stitch to be within deviation standards).
5. Hem served with stitch line no less than 1/16 inch from folded edge and no more than 1/8 inch.
6. Stitch line straight and evenly spaced.
7. No puckers visible at the hem.

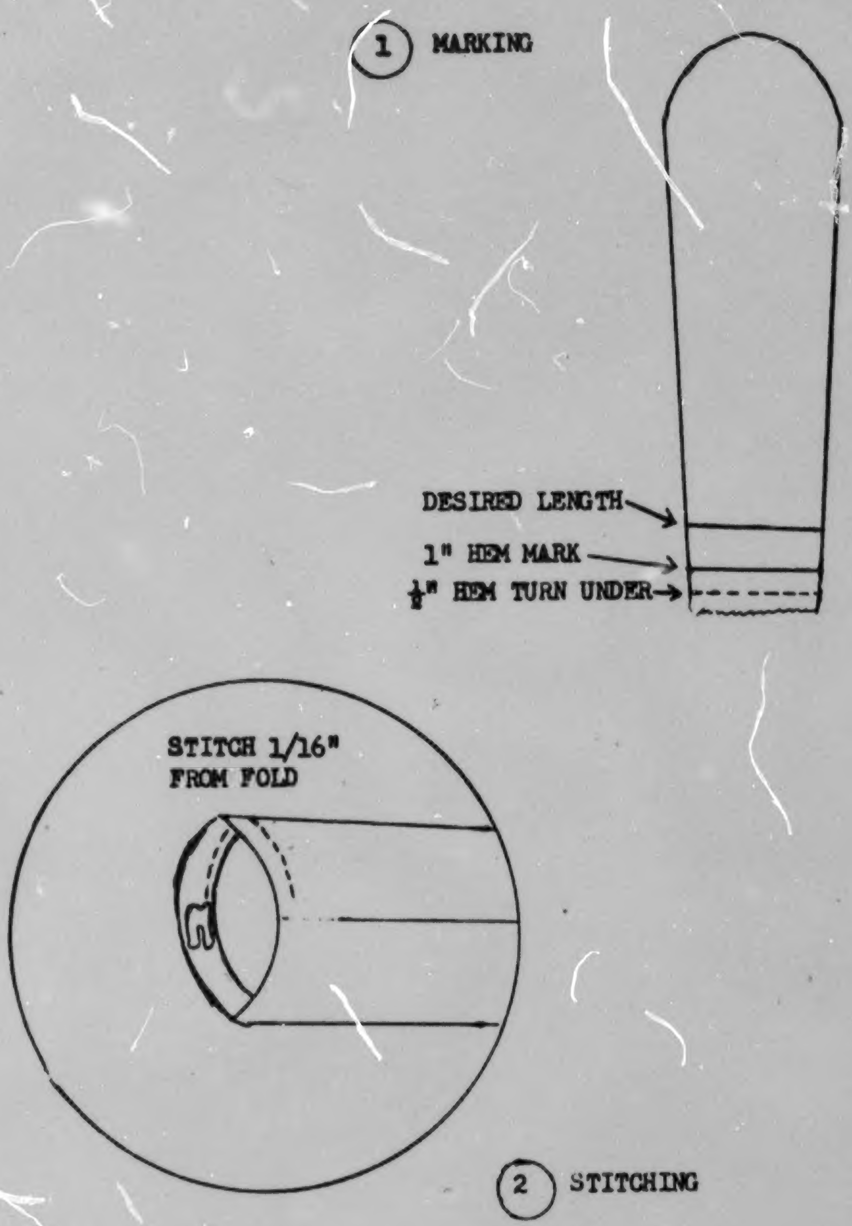
B. The performance steps to be followed in shortening of sleeves on the utility jacket are listed to the left of the page in the breakdown below. The key points which correspond in number to the performance steps are listed to the right of the page.

Shortening Sleeves on Utility Jackets.	
1. Measure amount to be shortened.	1. a. For demonstration, we will shorten 1½ inches. b. Lay jacket on table with sleeves extended. c. Measure 1½ inches up from the sleeve end.
2. Mark amount to be shortened.	2. a. Place a mark on the sleeve 1½ inches from the sleeve end. b. Mark all around the sleeve. c. Make sure your mark is even and straight.

3. Rip out old hem.	3. a. Use the ripper. b. Cut stitches holding old hem. c. Do not cut material. d. Remove old and loose stitches.
4. Mark for hem and turn under.	4. a. Hems for utility jackets are one inch wide. b. Turn under for hems are ½ inch. c. Place a mark 1 inch (down toward the sleeve end) from the shortening mark and all around the sleeve for the hem allowance. d. Place another mark ½ inch down from the hem allowance mark and all around the sleeve. This mark will be the mark to cut on to remove excess material and give us a ½ inch turn under. e. Make sure the hem allowance mark and turn under allowance mark are straight, even, and marked all around the sleeve.
5. Cut off excess material.	5. a. Cut on the ½ inch turn under allowance mark. b. Use scissors and cut even and straight. c. Cut one layer of material and on the mark. DO NOT try to cut, by folding the sleeve end together, because you will cut crooked and the edge will be jaggered.
6. Fold new hem.	6. a. Fold on the mark made for the desired length. b. Fold new hem into the sleeve opening. c. Make sure fold is even, straight and on the mark. d. You can crease the material, by rubbinb with the scissors.
7. Place sleeve under presser foot.	7. Place sleeve so inside of sleeve is under presser foot.

8. Sew new hem.	8. a. Fold material under on the ½ inch turn under mark. b. Place needle into hem, no less than 1/16 inch from the ½ inch turn under mark and no more than 1/8 inch from the mark. c. Stitch as close to 1/16 inch from the edge as possible. d. Stitch all around inside of sleeve and tack over the starting point no more than 1 inch, and no less than 7/8 inch long. e. Make your stitch line even and straight and tack in same stitch row. f. When sewing, make your turn under and stitch a little at a time, turning the sleeve as you sew. g. Do not pull on the sleeve, or you will sew crooked and the hem will come out crooked.
9. Press out sleeve end.	9. a. Use a damp cloth. b. Iron out chalk mark. c. Iron hem flat and put crease back into sleeve.

NOTE: Both sleeves are shortened in the same manner.


1 MARKING
DESIRED LENGTH
1" HEM MARK
½" HEM TURN UNDER
STITCH 1/16"
FROM FOLD
2 STITCHING

SHORTENING JACKET SLEEVE
(UTILITY)
Figure 14

SECTION XXXXII

SHORTENING LEGS OF UTILITY TROUSERS

PRECIS

1. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in shortening legs of utility trousers. This instruction will include measuring for the desired length, marking, ripping stitches from the old hem, cutting off the excess material, and sewing a new hem.

2. This alteration is performed in the same manner as shortening the sleeves on the utility jacket. The procedure for taking measurements of the trouser differs from the utility jacket, therefore it is necessary that you refer back to the section of "Fitting of Clothing" when required.

B. Objective

As a result of this instruction, the student, given used utility trousers, yardstick, tailor's chalk, measurements appropriate to desired length and hem width allowance, and appropriate performance standards, will measure and mark trousers to a specific given length, and measure and mark appropriate hem allowance; given a ripper and scissors, will rip out old hem and trim off excess material; given appropriate references, 31-15 sewing machine, and supplies, will fold and sew new hem to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

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II. Presentation

A. Seam Type Used - The seam type to be used when applying a new hem to the trousers utility will be seam type #1.

B. Measuring and Marking

1. When making measurements for the desired length required. Measurements are taken from the crotch seam down the inseam of the trouser leg to the trouser bottom at the desired length.

2. Before making the markings on the trouser bottoms, make certain that the trouser legs are laying flat on the table.

3. For best results, for a neat appearance and proper measurements, will require that all markings are straight and evenly spaced.

C. Ripping out old hem

1. By use of the ripper, cut and remove old stitches from the hem.

2. When cutting old stitches from the hem, it is necessary that you take necessary precautions so as to not damage the trousers.

D. Sewing the new hem

1. The new hem is sewed to the trouser leg with seam type #1.

2. Make every effort that the folds at the desired length and turn under material, are precisely on the markings made.

3. Hem should be sewn with a straight stitch line and the stitches properly formed.

E. Operator's Maintenance and Maintaining DA Form 2404.

1. It is important that the shuttle be lubricated every time a bobbin is replaced.

2. When unusual noises come from the machine and/or other mal-

functions arise beyond the operator's capabilities, this condition will be reported to the instructor.

3. Maintain DA Form 2404 as required.

SHORTENING LEGS OF UTILITY TROUSERS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the performance steps and key points to be followed in shortening legs of the utility trousers. At this time the student will listen, observe, and ask questions when in doubt. The student will perform a practical exercise on shortening legs of utility trousers. The student should not hesitate to call on the instructor for assistance, when necessary.

II. Study Reference

AR 700-8400-1 "Issue and Sale of Personal Clothing" Page 41, paragraph 48.

TM 10-267 "General Repair for Clothing and Textiles", Page 13, paragraph 9c.

III. Tools, Supplies and Equipment Required

Salvage Utility and/or Khaki trousers (ample supply)

Tailor's tool kit (1 set per student)

31-15 sewing machine (1 per student)

Yardstick (ample supply)

Thread (2 cones per machine)

IV. Direction to Student

Follow the performance steps as outlined in paragraph VI, B for the student practical exercise. Again the student is encouraged to ask questions when in doubt, and also to call on the instructor for assistance when needed.

V. Performance Standards

The performance standards are established and to be used by the instructor in checking student practical exercise and to inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Trouser length shortened to the measurement as specified by the instructor.
2. Width of hem 1 inch, turn under material ½ inch.
3. Hem stitched no less than 1/16 inch and not more than 1/8 inch from folded edge.
4. Stitch line straight, and stitches properly formed.
5. No puckers should be visible at the hems.
6. Trouser legs should be both at the same length.
7. Stitch lines tacked (at the inseam) tack length should be within the deviation standards.

B. The performance steps to follow in shortening the trouser legs are listed to the left of the page, the key points to be remembered and correspond in number to the performance steps are listed to the right of the page.

Shortening Legs of Utility Trousers	
1. Prepare trousers for measuring and marking.	1. a. For demonstration, use a pair of trousers marked to be shortened to 26 inches.
	b. Lay trousers out flat on the table in the same manner as we did during resizing instructions.

	c. Fold the top trouser leg back out of the way.
2. Measure for desired length.	2. a. Place end of tape at the crotch seam. b. Measure from the crotch, down toward the cuff. c. Make sure leg lays flat and all wrinkles are out. d. Measure down to 26 inches.
3. Mark desired length on trouser leg.	3. a. Place a mark at 26 inches. b. With the yard stick draw a mark across the trouser leg width, on the 26 inch mark. c. Make sure your mark is even and straight. d. Mark completely around leg. (inside and outside seams). e. Place the top trouser leg on the bottom trouser leg. f. Flatten legs out, so both are even. g. Mark the top trouser leg even with the bottom leg and completely around leg. h. Make sure both marks are 26 inches from the crotch.
4. Rip out old hems.	4. a. Use the ripper. b. Cut stitches holding old hem. c. Do not cut material. d. Remove old and loose stitches.

5. Mark for hem and turn under.	5. a.	Hem for utility trouser leg is one inch wide.
	b.	Turn under is 1/2 inch.
	c.	Place one mark one inch down from the shortening mark. This is the hem allowance.
	d.	Place another mark 1/2 inch down from the hem allowance mark. This is the turn under allowance and the mark to cut off excess material.
	e.	With the yardstick, draw completely across the leg.
	f.	Make sure lines are straight.
	g.	Mark both legs alike.
6. Cut off excess material.	6. a.	Cut on the ½ inch turn under allowance mark.
	b.	Use the scissors.
	c.	Cut on one layer of material and cut straight.
	d.	Cut both legs alike.
7. Fold new hem.	7. a.	Fold on the 26 inch mark.
	b.	Fold material into the leg opening.
	c.	Fold even and straight.
	d.	Crease with scissors.
8. Sew new hem.	8. a.	Place leg so inside seam of trousers is under the presser foot.
	b.	Fold material under on the 1/2 inch turn under mark.
	c.	Place needle into hem, no less than 1/16 inch from the ½ inch turn under mark and no more than 1/8 inch from the mark.

d. Stitch as close to 1/16 inch from the edge as possible.

e. Stitch all around inside of leg and tack over the starting point no more than one inch long and no less than 7/8 inch long.

f. Make your stitch line straight and tack in the same stitch row.

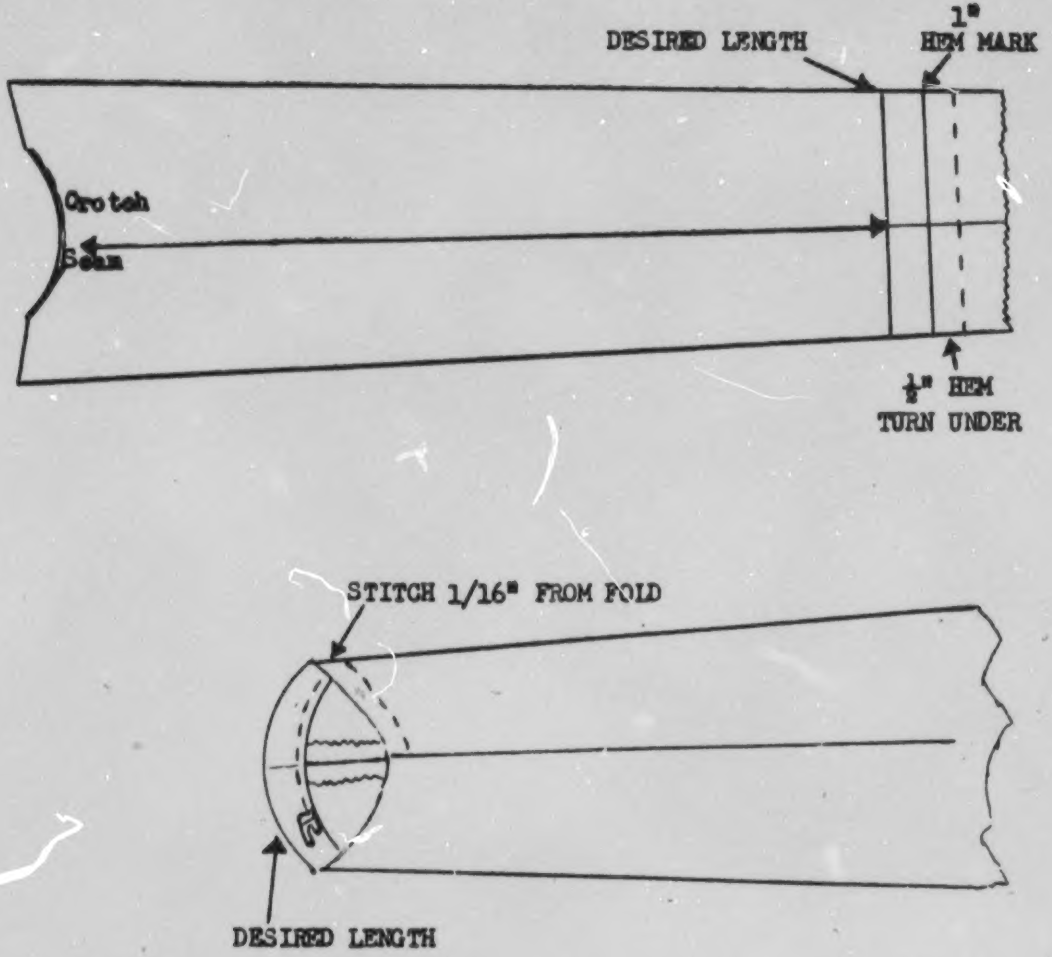
g. When sewing, make your turn under and stitch a little at a time turning the leg as you sew.

h. Do not pull on the leg, or the material will pucker.

9. Press out leg hem.

9. a. Use a damp cloth and iron out chalk marks.

b. Iron hem flat and put creases in the proper place.


DESIRED LENGTH
1"
HEM MARK
Crotch
Seam
½" HEM
TURN UNDER
STITCH 1/16" FROM FOLD
DESIRED LENGTH

SHORTENING TROUSER LEGS (UTILITY)

Figure 15

SECTION XXXXIII

SHORTENING LEGS OF WOOL TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in shortening legs of wool trousers. Like the alteration of the utility trousers this instruction will also include measuring for the desired length, marking, ripping and removing old stitches from the hem, cutting off the excess material, and sewing a new hem.

2. Since the trouser, wool is normally worn as a class "A" or "dress" uniform, appearance is the primary factor considered in the classification standards. This factor must be considered in making alterations to this type of clothing. For this reason the alteration procedures followed in shortening the wool trouser leg will be performed by hand sewing.

B. Objective

As a result of this instruction, the student, given used wool trousers, yardstick, tailor's chalk, measurements appropriate to desired length and hem width allowance, and appropriate performance standards, will measure and mark trousers to a specific given length, and measure and mark appropriate hem allowance; given a ripper and scissors, will rip out old hem and trim off excess material; given appropriate references, hand sewing tools, and supplies, will fold, baste, and hand sew new hem to the satisfaction of minimal deviation standards established by the school, given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Types of Hand Stitches Used

1. During this alteration you will use the basting stitch as a temporary stitch to hold the hem in place.

2. The permanent type stitch that will hold the hem in place, is the cross stitch.

B. Measuring and Marking

1. The most effective manner to determine the proper length of the trouser, is to have the individual try them on and mark in accordance with the proper concept of fit.

2. If the trouser are to be altered in compliance to the measurement designated on a alteration tag. Then measure down the inseam from the crotch seam to the bottom of trouser leg and the desired length.

3. When marking for a new hem, make certain markings are straight and evenly spaced.

C. Ripping Old Hem

1. With use of the ripper, cut and remove the old stitches from the hem.

2. Observe the safety precautions, do not damage the trouser when ripping the old stitches with the ripper.

D. Stitching the New Hem

1. Apply two rows of basting stitches, this will serve as a temporary stitch to hold the hem in place.

2. Apply the cross stitch at the raw edge of the hem. Make certain that the cross stitch does not penetrate through the material. Stitches should not be visible on the face side of material, when completed.

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E. Operator's Maintenance and Maintaining DA Form 2404.

NOTE: If your sewing machine was utilized during any portion of the day that this instruction was presented, you will be required to perform the operator's preventive maintenance service to your machine.

SHORTENING LEGS OF WOOL TROUSERS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the performance steps and key points to be followed in shortening legs of wool trousers. At this time the student will listen, observe and ask questions when in doubt. The student will perform a practical exercise on shortening trouser legs of wool trousers. The students should not hesitate to call on the instructor for assistance, when necessary.

II. Study Reference

AR 700-8400-1, "Issue and Sale of Personal Clothing" Page 41, paragraph 48.

TM 10-267, "General Repair for Clothing and Textiles," Page 8, paragraph 7e.

TM 700-8400-1, "Fitting of Uniform" Page 12, paragraph 9e.

III. Tools, Supplies and Equipment Required

Salvage wool trousers (ample supply)

Tailor's tool kit (1 set per student)

Yardstick (ample supply)

Thread (ample supply)

IV. Direction to Student

Follow the performance steps as outlined in paragraph VI, B for the student practical exercise. The student is encouraged to ask questions when in doubt, during the demonstration and/or practical exercise.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student practical exercise and to inspect the final results for grading purposes.

VI Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Trousers shortened to the specified measurements as determined by the instructor.

2. Width of the hem 2 inches.

3. Cross stitches properly constructed 1/4 inch high and spaced 1/4 inch apart.

4. Hem straight and even with no puckers visible.

5. Cross stitches should not be visible from the face side of hem.

6. Cross stitches should not extend not more than 1/16 inch from the raw edge of the hem.

7. When completed both trouser legs should be of the same length.

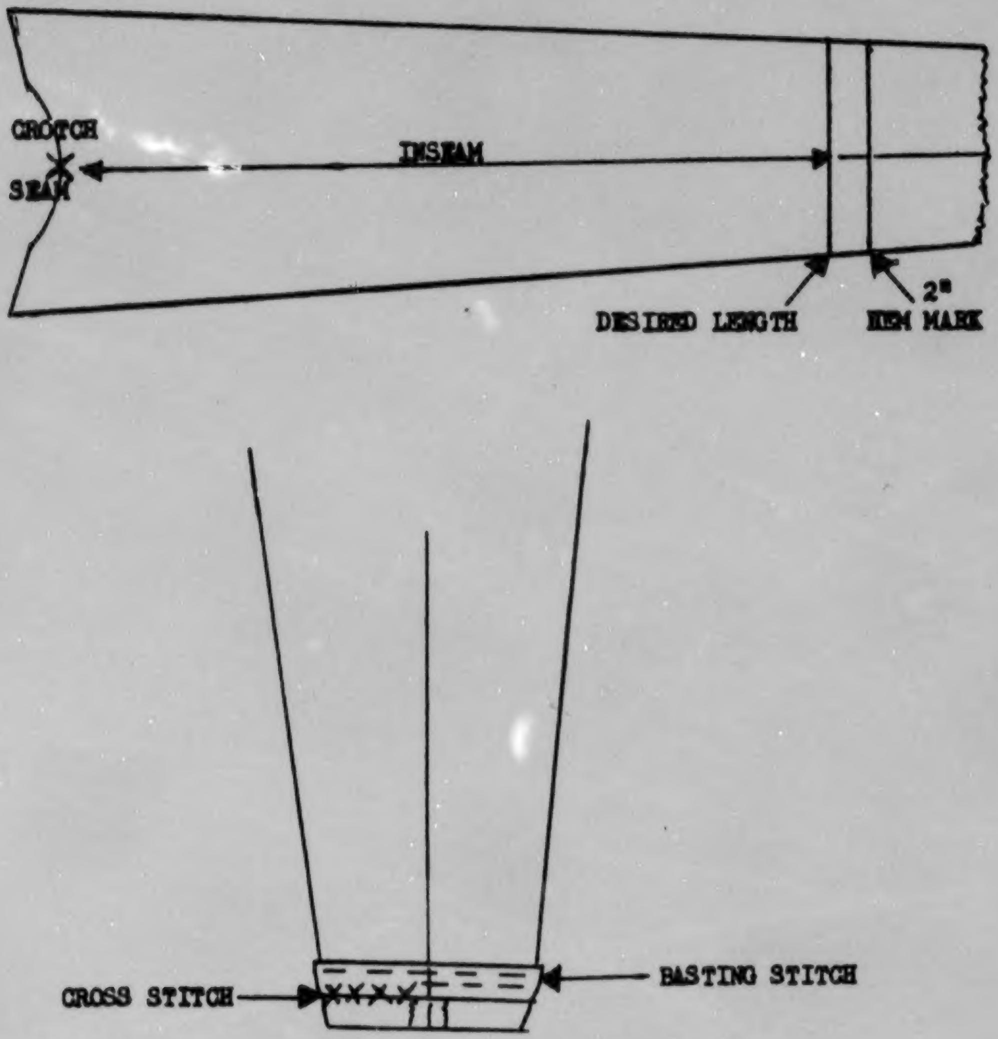
B. The performance steps to follow in shortening the wool trouser legs are listed to the left of the page, the key points to be remembered and correspond in number to the performance steps are listed to the right of the page.

Shortening legs of wool trousers.

1. Remove old stitches from hem.	1. a. Use ripper to cut stitches.
	b. Do not cut material.
	c. Remove loose stitches.

2. Press trouser bottoms.	2. a. Unfold old hem to the outside.
	b. Use a damp cloth.
	c. Iron out old crease.
3. Prepare trousers for measuring and marking.	3. a. Lay trousers out flat as we did in resizing and folding.
	b. Fold the top trouser leg back out of the way.
	c. The instructor will demonstrate using the desired length of 30 inches.
4. Measure for desired length, and mark.	4. a. Place end of tape at the crotch seam.
	b. Measure down to 30 inches.
	c. Mark at the 30 inch measurement and all around leg.
5. Measure and mark hem allowance.	5. a. Measure down and mark 2 inches from the desired length mark.
	b. Mark completely around the leg.
6. Cut off excess material.	6. a. Cut on the 2 inch hem allowance mark.
	b. Use scissors.
	c. Cut even and straight.
7. Mark other leg and trim off excess.	7. a. Lay top trouser leg on top of bottom trouser leg.
	b. Make sure both legs are even and flat.
	c. Mark top trouser leg even with bottom trouser leg marks.
	d. Trim off excess material with scissors.

8. Fold hem and baste.	8. a. Turn trouser leg inside out. b. Fold hem on the desired length mark. c. Place one row of basting stitches ½ inch from the bottom of the hem. d. Place another row of basting stitches ½ inch from the raw edge of the hem. e. Make sure hem lays flat.
9. Cross stitch hem.	9. a. Make your cross stitches the same as you did in hand sewing. b. Make the stitches 1/4 inch long, and 1/4 inch apart. c. Make sure the stitches do not show on the outside of the material. d. Do not pull too hard as to make the hem pucker.
10. Press cuff and remove basting stitches.	10. a. Use a damp cloth. b. Press cuff flat and press in the front and rear creases on leg. c. Remove all basting stitches.


CROTCH
SEAM
INSEAM
DESIRED LENGTH
2"
HEM MARK
CROSS STITCH
BASTING STITCH

SHORTENING TROUSER LEG (WOOL)

Figure 16

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SECTION XXXXIV

LENGTHENING LEGS OF UTILITY TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in lengthening the legs of utility trousers. This instruction will include by measuring, marking, cutting extension piece, ripping the old hem, attaching extension piece to trouser by sewing, and sewing a new hem.

2. This alteration will be a little different than the previous hours of instruction on shortening of utility trousers. When shortening a pair of trouser legs, normally we cut off the excess material, however when lengthening the trouser legs of trousers you will be required to add an extension piece, because of the limited material of the existing hem.

B. Objective

As a result of this instruction, the student, given used utility trousers and a ripper, will rip stitches from old hem; given yardstick, tailor's chalk, measurements appropriate to desired length of trousers, width and length of extension piece, and scissors, will measure and mark trousers to desired length, and cut extension piece to desired width and length; given 31-15 sewing machine, supplies, and appropriate performance standards, will stitch extension piece to trouser bottom and fold and sew hem to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Ripping and preparing trouser legs at hem.

1. Rip stitches from hem with ripper, be particularly careful not to damage the trouser bottom.

2. Remove all old loose stitches from the hem.

3. For best results, with handiron, press the trouser bottom of legs at the old hem area out flat.

4. Trim the bottom edges of the trouser legs, cut only that portion required to make a straight even edge across the bottom.

B. Preparing extension piece of material.

1. Select material most suitable for size and shade of the utility trouser. Salvaged trousers will be used.

2. The width of extension piece will be 2" and length required will be determined by the trouser leg with which you are working with, normally 20", add 1" for seam.

C. Marking and Cutting Trouser Leg and Extension Piece of Material.

1. At the bottom of the trouser leg, mark a straight line around the entire leg ½" from the edge.

2. Mark the extension material in the same manner 1/2" for seam purposes, and cut off excess material.

3. All markings and cutting will be performed properly in accordance with our performance standards and demonstrated by the instructor.

D. Sewing extension material and sewing hem to trouser leg on utility trouser.

1. Sew extension material together by joining the two ends with a

simple seam.

2. Sew extension piece of material to trouser leg using seam type #3.

3. Turn under extension material and pin in place to trouser leg. Remember that extension material will not be visible when completed.

4. Complete by sewing hem, using seam type #1.

5. For best results and neater appearance, with use of handiron, press flat the area of trouser leg just completed.

E. Operator's maintenance and maintaining DA Form 2404.

1. Make certain to lubricate all the oil points of your sewing machine as required.

2. The shuttle race will be kept clean, free of dirt and lint, and lubricated each time a full bobbin is replaced.

3. Maintain DA Form 2404 daily.

LENGTHENING LEGS OF UTILITY TROUSERS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the performance steps and key points to be followed in lengthening trouser legs of the utility trousers. At this time the student will listen, observe, and ask questions when in doubt. Following the demonstration the student will perform a practical exercise on lengthening the legs on the utility trousers. The student will be encouraged to call on the instructor for assistance when needed.

II. Study Reference

AR 700-8400 "Fitting of Uniform", page 12, par 2.

TM 10-267 "General Repair for Clothing and Textiles" page 14, fig 12; page 16, fig 14.

DA Form 2404 "Equipment Inspection and Maintenance Worksheet"

III. Tools, Supplies, and Equipment Required

Salvage utility and/or khaki trousers (ample supply)

Tailor's tool kit (1 set per student)

31-15 sewing machine (1 per machine)

Yardstick (ample supply)

IV. Direction to Student

Follow the performance steps as outlined in paragraph VI, B for the student practical exercise. The student is encouraged to ask questions when in doubt, also to call on the instructor for assistance when necessary.

V. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Trouser legs lengthened to the maximum length with material available (approximately 1 inch longer).

2. Width of hem when completed, 1 inch.

3. Hem stitch no less than 1/16 inch and not more than 1/8 inch from the folded edge.

4. Both trouser legs the same length when completed.

5. Seams started and tacked on the inseam of the trouser leg.

B. The performance steps to follow in lengthening of the trouser leg on utility trousers are listed to the left of the page, the key points to be remembered and correspond in number to the performance steps are listed to the right of the page.

Lengthening Legs of Utility Trousers

1. Prepare trousers for measuring and marking.	1. a. Instructor will explain to student that the trousers will be made longer to the maximum length, with the material available.
	b. Cut stitching of old hem with ripper, take caution not to damage the trousers.
	c. Clean and remove old loose stitches from trouser bottom hem.
	d. Press out old hem seams, and cut bottom edges even.
2. Prepare extension material for trouser leg.	2. a. Select extension material of the proper shade and size.

	b. Measure width of trouser legs at bottom. (Width is normally 20")
	c. Cut the extension material 2" wide and the length to same width of trouser leg.
	d. When cutting material, make long even cuts with the scissors, this will eliminate ragged or crooked edges.
3. Marking of trouser legs and extension material.	3. a. Mark a straight line around the trouser leg, ½" from the bottom edge.
	b. When marking, use a fine chalk mark.
	c. Mark extension material ½" from edge. This will be done on face side of material, and only the marking from one edge is required.
4. Sewing extension material to trouser leg and sewing new hem.	4. a. Join the two ends of the replacement material together ½" from the edges using a simple seam. Make certain you lack the seam at both ends.
	b. Open seams and stitch on both sides of the simple seam.
	c. Place the extension material outside the trouser leg, material will be face to face. Seam of extension material will be placed on inseam of trousers.
	d. Pin the extension material to the trouser legs at two points, the inseam and outseam of the trouser leg.
	e. Edges of the extension material and trouser leg bottom should be even.

f. Starting at the inseam of the trouser, join the trouser leg and extension material by sewing a simple seam around the width of the trouser leg.

g. Pull down extension material past the trouser leg. The seam joining the trouser with the replacement material will also be turned in the down position.

h. Again starting at the inseam, sew around the trouser leg, a top stitch on the replacement material 1/16" from the seam. This will form seam type #3.

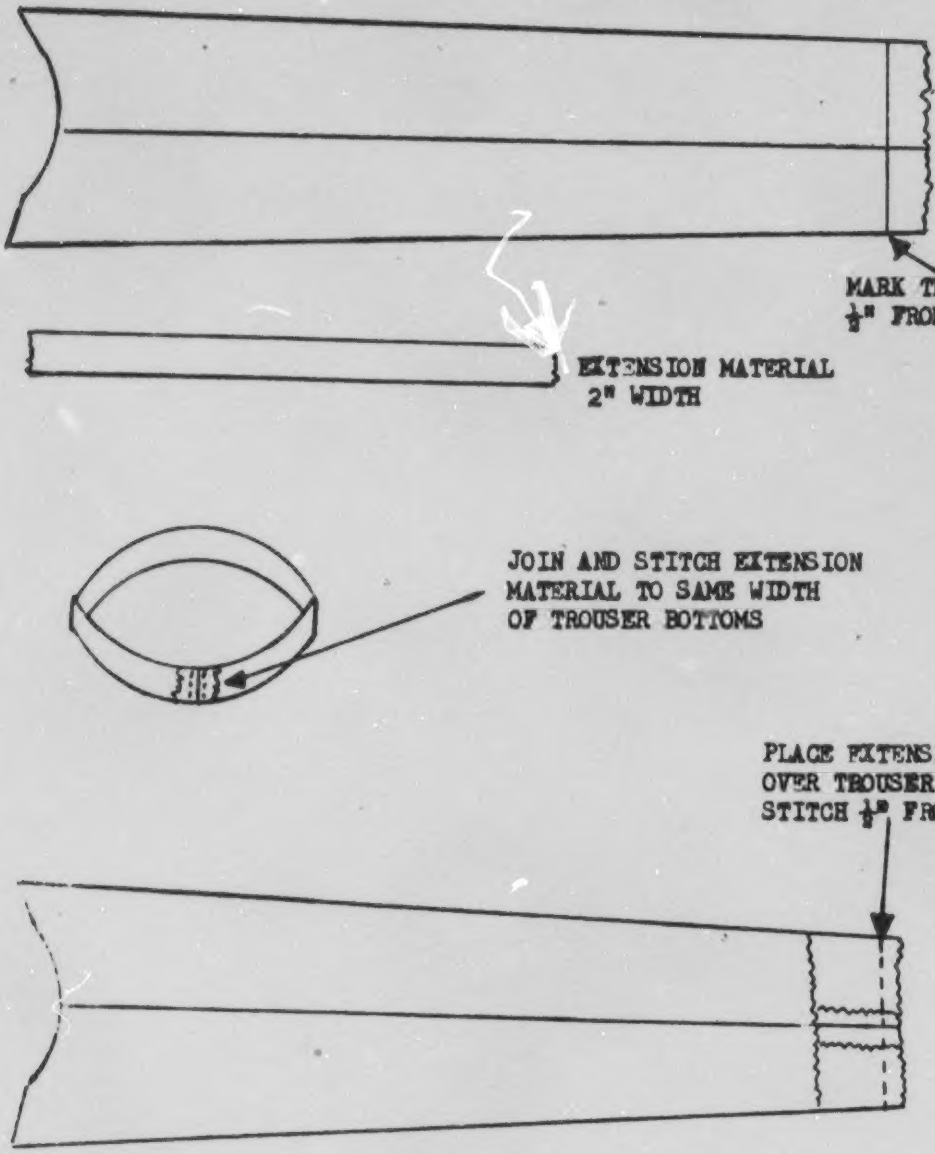
i. At the seam where trouser leg and extension material join, fold under, make certain that seam and extension material will not be visible when folded.

j. Place pins at two points, again at the inseam and outseam, this will hold material in place.

k. Turn under raw edge at the marking, 1/2" from the edge. Starting at the inseam, sew new hem to trouser leg with seam type #1.

l. For best results and for a neater appearance, press new hem down with the flat iron.

m. Instructor will complete demonstration with one trouser leg, but student will be required to complete both trouser legs of the trousers.



MARK TROUSER LEG
½" FROM BOTTOM

EXTENSION MATERIAL
2" WIDTH

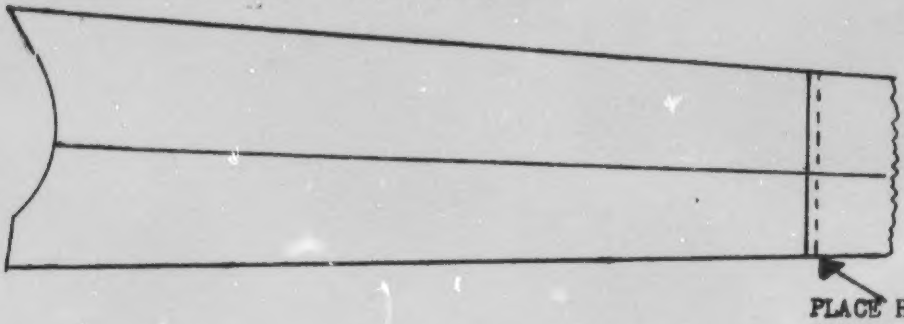
JOIN AND STITCH EXTENSION
MATERIAL TO SAME WIDTH
OF TROUSER BOTTOMS

PLACE EXTENSION MATERIAL
OVER TROUSER BOTTOM
STITCH ½" FROM EDGE

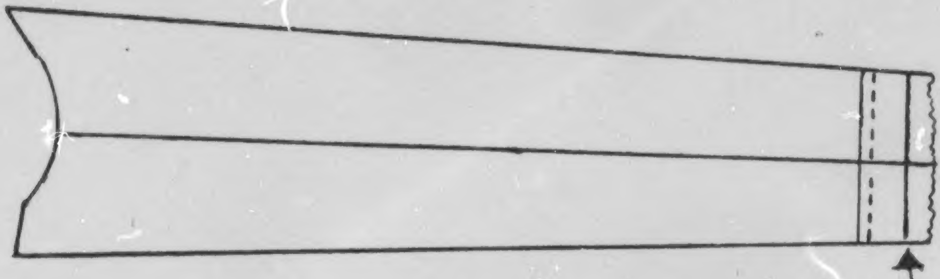
LENGTHEN TROUSER LEGS (UTILITY/KHAKI)

Figure 17

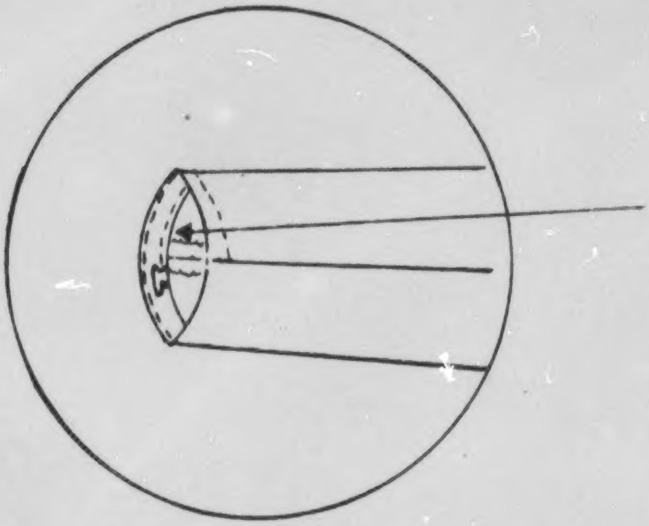
LENGTHEN TROUSER LEGS - (CONTINUED)



PLACE HEMS DOWN
STITCH 1/16"
FROM SEAM



MARK $\frac{1}{2}$" FROM
BOTTOM EDGE



TURN UNDER $\frac{1}{2}$" ON MARK
STITCH 1/16" FROM
FOLDED EDGE

SECTION XXXXV

LENGTHENING LEGS OF WOOL TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in lengthening legs of wool trousers. This instruction will include measuring, marking and cutting an extension piece, ripping the old hem loose, attaching the extension piece to the trouser leg, and sewing a new hem by hand stitching.

2. It was mentioned in the previous hours of instructions, that lengthening trousers with an extension piece is performed only when the original hem of the trouser does not contain enough material to have an authorized size hem when completed. The authorized size hem of the trouser, wool is two (2) inches.

B. Objective

As a result of this instruction, the student, given used wool trousers and a ripper, will rip stitches from old hem; given yardstick, tailor's chalk, measurements appropriate to desired length of trousers, width and length of extension piece, and scissors, will measure and mark trousers to desired length and cut extension piece to desired width and length; given 31-15 sewing machine, supplies, and appropriate performance standards, will stitch extension piece to trouser bottom, given appropriate hand sewing tools and supplies will baste and hand sew hem on trouser bottom to the satisfaction of minimal deviation standards established by the school;

given DA Form 2404 and appropriate check list, will perform operator's maintenance on machines as necessary and maintain DA Form 2404.

II. Presentation

A. Ripping and preparing trouser legs at hem.

1. Rip stitches from hem with ripper, and take necessary precaution not to damage the trouser leg at bottom.

2. Remove all old loose stitches from area of trouser hem.

3. With a flat iron, press the area of trouser hem down flat. This will facilitate marking the trouser leg.

4. If the bottom of trouser at the edges is uneven, mark and trim the uneven portion only. Bottom edges should be straight across the width of the trouser leg.

B. Preparing extension piece of material.

1. Select material to be used for extension piece. This material should be of the same shade and texture. Salvaged wool trousers will be used for this purpose.

2. The width of the extension piece will be two and one-half inches. The length of the extension piece will be determined by the width of the trouser bottom, (normally twenty inches), plus another inch for seams.

3. When preparing the extension material, it is important that it be marked and cut evenly and straight, and to the precise measurements.

C. Marking trouser leg and extension piece.

1. At the bottom of the trouser leg, mark a straight line around the entire leg, ½ inch from the edge.

2. The extension material will be marked in the same manner ½

inch from the edge, and across the entire length of the material. This marking will be made on only one edge, and on the back side of the material. T[illegible] marking must be straight, for it will be used as a guide for sewing.

3. All markings will be performed peroperly, and in accordance w[illegible] our performance standards, which will be explained and demonstrated by t[illegible] instructor.

D. Sewing the extension material and sewing the hem to trouser leg on wool trousers.

1. Sew extension piece together, by joining the two ends, with a simple seam (material at this time will be face to face).

2. Turn trouser leg, wrong side out, and place extension material inside trouser leg at bottom edge. Face side of extension material to face side of trouser leg (at this time the marking of the extension piece should be shown and at the bottom edge of trouser).

3. Extension piece seam should be at the inseam of the trouser leg.

4. Sew a simple seam joining the extension piece to the trouser leg, following the mark shown on the extension piece.

5. Turn down the extension piece together with the 1/2 inch seam, and apply a top stitch 1/16 inch from the simple seam, forming seam type #3.

6. Fold under extension material, forming a hem (2 inches). Apply the basting stitch, and complete with the cross stitch.

7. Extension material will not be visible when completed.

8. With hand iron press the bottom area of trouser leg flat.

E. Operators maintenance and maintaining DA Form 2404.

1. Make certain to lubricate all the oil points of your sewing machine as required.

2. Keep the moving parts of the sewing machine free of dirt and lint.

3. Maintain DA Form 2404 as required.

LENGTHENING LEGS OF WOOL TROUSERS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the performance steps and key points to be followed in lengthening legs of wool trousers. At this time the student will listen, observe, and ask questions when in doubt. The student will perform a practical exercise on lengthening legs of wool trousers. The student should not hesitate to call on the instructor for assistance during the practical exercise.

II. Study Reference

AR 700-8400-1 "Fitting of Uniform" page 12, par 2.

TM 700-8400-1 "Fitting of Uniform"

TM 10-267 "General Repair for Clothing and Textiles" page 14, fig 12; page 16, fig 14.

III. Tools, Supplies and Equipment Required

Salvaged wool trousers (ample supply)
Yardstick (ample supply)
Tailor's tool kit (1 set per student)
31-15 sewing machine (1 per student)
Thread (2 cones per machine)

IV. Direction to Student

Follow the performance steps as outlined in paragraph VI, B for the student practical exercise. The student is encouraged to ask questions when in doubt, and also to call on the instructor for assistance when needed.

V. Performance Standards

The performance standards are established and to be used by the instructor in checking student practical exercise and to inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Trouser legs lengthened to the maximum with material available (approximately 2 inches longer).

2. Width of trouser leg hem should be 2 inches.

3. Cross stitch applied and formed properly (1/4 inch high and 1/4 inch apart).

4. Extension piece properly joined to the trouser leg with seam type #3.

5. Extension piece should not be visible from face side of trousers or when worn.

6. All stitch lines (machine and hand stitches) should be properly formed and evenly spaced and also tacked.

B. The performance steps to follow in lengthening the wool trouser legs are listed to the left of the page. The key points to be remembered and correspond in number to the performance steps are listed to the right of the page.

Lengthening Legs of Wool Trousers.

1. Prepare trousers for measuring and marking.	1. a. Instructor will explain to student that the trousers will be made longer to the maximum length, with the material available.

	b. Cut stitching of old hem with a ripper, take caution not to damage the trousers.
	c. Remove all old loose stitches from trouser bottom.
	d. With hand iron press flat area of hem on trouser bottom.
	e. If edges of trouser bottom is uneven, cut and trim evenly.
2. Prepare extension material.	2. a. Select extension material of the proper shade and size (use salvaged wool trousers).
	b. Measure width of trouser leg at bottom. (width is normally 20 inches).
	c. Mark and cut extension piece from replacement material. (Width 2½ inches, length the same width of trouser bottom and add one inch for seaming purpose).
	d. When cutting the extension material make certain to cut with long even cuts of the scissors. This will eliminate ragged or uneven edges.
3. Marking of trouser leg and extension piece.	3. a. Mark a straight line around the trouser bottom, ½ inch from the edge.
	b. Mark extension piece ½ inch from edge across the entire length. This will be required on one edge of material only. Make marking on back side of material.
4. Sewing extension material to trouser leg.	4. a. Join the two ends of the extension piece together 1/2 inch from the edges using a simple seam. Make certain to tack the seams.
	b. Open seams and stitch down on both sides of the simple seam.

c. Turn the trouser leg wrong side out.

d. Place the extension material inside the trouser leg at bottom edge, material will be face to face. (Marking on extension piece will be shown and edge even with edge of trouser bottom.)

e. Seam of extension piece should be placed just off the inseam of the trouser leg.

f. Pin the extension piece to the trouser leg at two points, the inseam and outseam of the trouser leg.

g. Edges of the extension piece and trouser bottom should be even.

h. Starting at the inseam of the trouser, join the trouser leg and extension piece by sewing a simple seam around the width of the trouser bottom. (Follow chalk mark on extension piece.)

i. Turn down extension material and seams joining the extension piece and trouser bottom.

j. Again starting at the inseam sew a top stitch on the extension piece 1/16" from the simple seam around the width of the trouser leg. This will form seam type #3.

5. Sewing new hem.

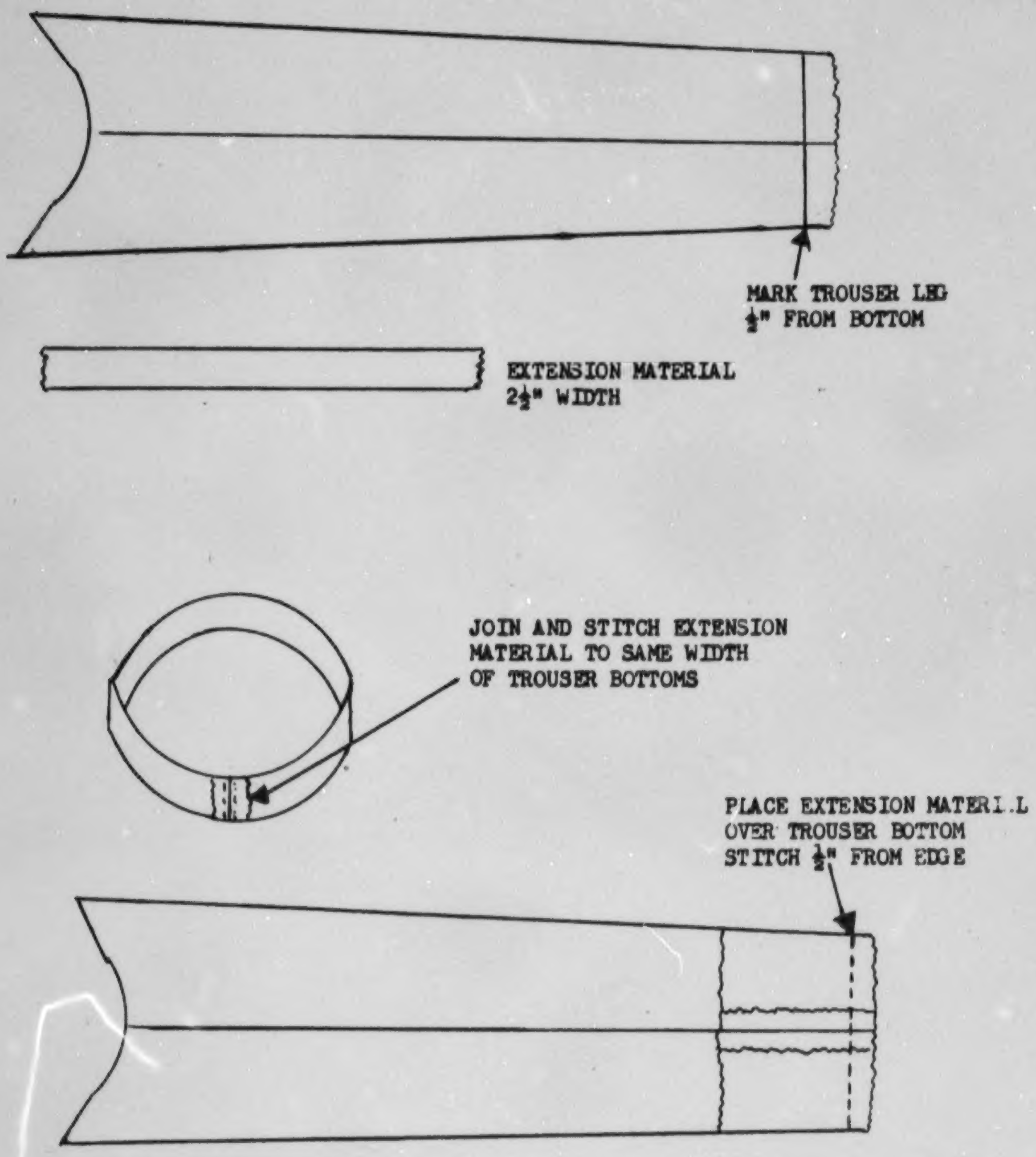
5. a. Fold under extension material to form a new hem (2 inches) make certain that seam and extension piece will not be visible, when worn.

b. With a basting stitch, sew down hem 1/2" from folded edge, and a second row of basting stitches 1/2" from the raw edge of hem.

c. Sew hem of trouser with the cross stitch. Cross stitch will be applied and evenly spaced as per instructions during the hand sewing subcourse.

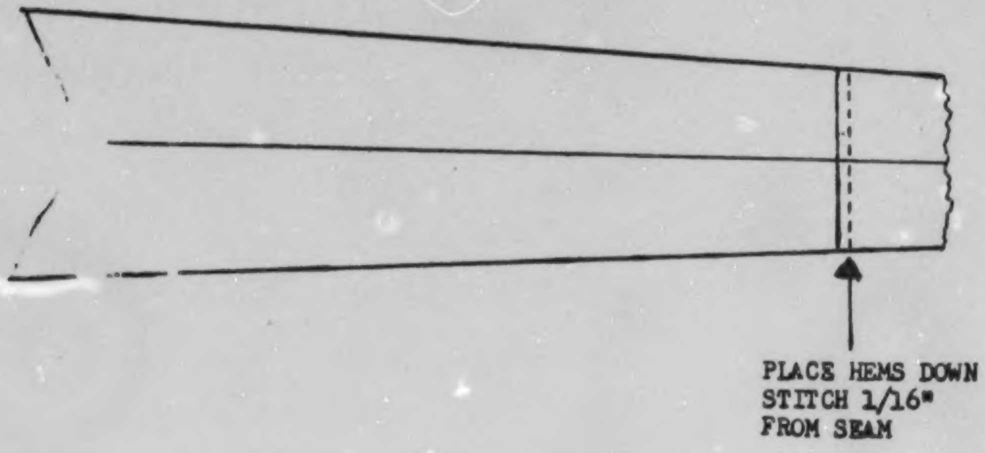
d. Press trouser bottom at hem area with hand iron.

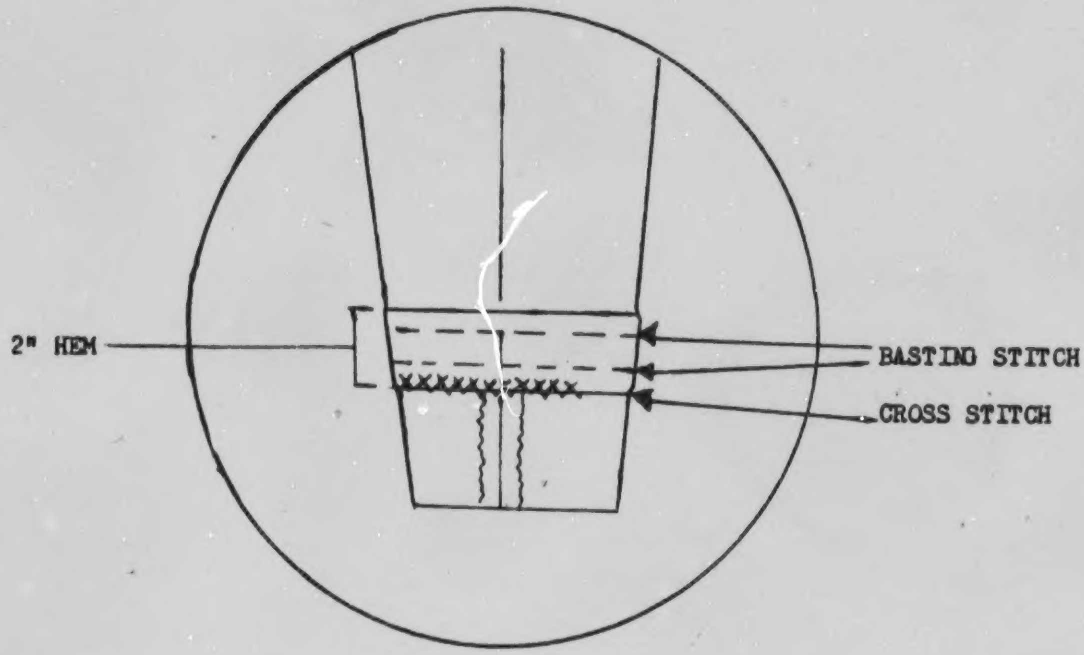
Figure 18


MARK TROUSER LEG
½" FROM BOTTOM
EXTENSION MATERIAL
2½" WIDTH
JOIN AND STITCH EXTENSION
MATERIAL TO SAME WIDTH
OF TROUSER BOTTOMS
PLACE EXTENSION MATERIAL
OVER TROUSER BOTTOM
STITCH ½" FROM EDGE

LENGTHEN TROUSER LEGS (WOOL)

LENGTHEN TROUSER LEG (WOOL) - Continued


PLACE HEMS DOWN
STITCH 1/16"
FROM SEAM


2" HEM
BASTING STITCH
CROSS STITCH

SECTION XXXXVI

WAIST AND CROTCH ALTERATIONS ON WOOL TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in the waist and crotch alteration on wool trousers. This instruction will include taking-in and letting-out the waist and crotch of the trousers, by, measuring, marking, ripping seams, and resewing seams.

2. In a previous subcourse you were taught the approved concept of fit for the trousers. During that period you learned that the trouser will fit easily around the natural waist without bulging, with the bottom of the waistband resting on top of the hip bone. The waist must have about ½ inch of ease. You also learned that properly fitted trousers will have a slight ease at the crotch.

3. Having this knowledge of the approved concept of fit, it will be your duty to make the alterations accordingly.

4. As Clothing and Textile repairmen you are not only interested in the proper concept of fit, but you are also interested in making the proper alterations by following the proper procedures. If a waist or crotch alteration is not performed properly, it can badly effect the appearance of a pair of trousers.

B. Objective

[illegible]s a result of this instruction, the student, given appropriate references, used wool trousers, tailor's chalk, ripper, yardstick, and appropriate measurements for waist and crotch alteration, will measure and mark waist and crotch to desired measurements, and rip loose the waist and seat seam, waistband, belt loop, crotch reinforcement piece, and both crotch seams; given a 31-15 sewing machine, appropriate performance standards, and supplies, will resew both crotch seams, waist and seat seam, waistband, and belt loop to the satisfaction of minimal deviation standards established by the school; given hand sewing tools, will resew crotch reinforcement back into trousers, trim off excess materials, and finish raw edges of seam to the satisfaction of minimal deviation standards established by the school; using hand iron, the student will change the back crease of trouser to the satisfaction of instructor; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Waist alteration on trousers.

1. Prepare waist.

a. The first step is to remove the belt loop over the waist seam.

b. Be cautious not to damage the trouser with the ripper.

c. Loosen stitching by cutting waistband seam from lining.

2. Marking

a. Lay trousers on table in such a manner that the waist seam lays flat.

b. From desired measurement mark, draw a tapering line down the seat seam to a point on the seam. This will eliminate any puckering when complete.

3. Sewing waist seam and waistband

a. Starting at the extreme edge of waistband lining on the desired measurement mark, sew a seam following the chalk mark.

b. Sew down to the point of the taper and 1" beyond the point and seat seam, and tack the stitches.

c. Rip open the old waist seam and remove old loose stitches.

d. Press open the waist and seat seams, and cut off excess material.

e. Place waistband lining in original position. From top side of trousers replace stitching to waistband following old stitch line.

f. Replace belt loop.

B. Operator's maintenance and maintaining DA Form 2404.

1. Check the performance of your sewing machine and make necessary adjustments if required.

2. When in doubt of the operation of your sewing machine call on one of the instructors for assistance.

3. Maintain the DA Form 2404 as required.

C. Crotch alteration on trousers.

1. Prepare crotch.

a. Loosen crotch reinforcement piece from trouser.

b. Remove and loosen only that portion that is required to perform the alteration.

c. Remove old loose stitches.

d. Cut and remove stitches at crotch seam approximately 1½" beyond measurement mark.

2. Marking.

a. Starting at the crotch seam where desired measurement mark is placed, draw a straight line tapering down the inseam to a point 18" below starting point at crotch seam.

3. Sewing inseam and crotch seam.

a. Start with right leg at the point of the taper and 1" below. Place front seam of trouser on chalk mark and sew a seam up to the crotch seam.

b. On the left leg, start at the crotch seam and place the front seam on the chalk mark, and sew down the inseam to the point of the taper and 1" below.

c. Press open the seams, and cut off the excess material.

d. Restitch the crotch seam and reinforcement piece. Make certain crotch seam lays flat.

e. Change back crease of trouser.

WAIST AND CROTCH ALTERATION OF WOOL TROUSER

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the performance steps and key points to be followed in the waist and crotch alteration of wool trousers. At this time the student will listen, observe and ask questions when in doubt. The student will perform a practical exercise on the waist and crotch alteration of the wool trousers. During the practical exercise the student should not hesitate to call on the instructor for assistance when in doubt.

II. Study Reference

TM 700-8400-1 "Fitting of Clothing", page 11, fig 5; page 12, par 4.

DA Form 2404 "Equipment Inspection and Maintenance Worksheet".

III. Tools, Supplies, and Equipment Required

Salvaged wool trousers (ample supply)

Tailors tool kit (1 set per student)

31-15 sewing machine (1 per student)

Yardstick (ample supply)

Thread (2 cones per machine)

IV. Direction to Student

Follow the performance steps as outlined in paragraph VI, B for the student practical exercise. The student is encouraged to ask questions when in doubt, and also to call on the instructor for assistance when needed.

V. Performance Standards

The performance standards are established to be used by the instructor in checking the student practical exercise and to inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Crotch taken-in at the proper measurement as specified by the instructor.

2. Waist taken-in at the proper measurement as specified by the instructor.

3. Trousers tapered down the inseam to a point approximately 18" from crotch seam.

4. Waist tapered down seat seam approximately 9".

5. Waist and crotch alteration completed with no puckers visible.

6. Waistband lining properly stitched to trousers.

7. Crotch reinforcement piece replaced properly.

8. Belt loop replaced in proper position (waist seam).

B. The performance steps to be followed in the waist and crotch alteration are listed to the left of the page, the key points to be remembered and correspond in number to the performance steps are listed to the right of the page.

Waist Alterations.

1. Prepare waist for alteration.	1. a. Remove the belt loop, make certain no damage is done to belt loop or trousers.
	b. Place belt loop in pocket for safekeeping.
	c. Loosen waistband lining from trousers. Do not loosen any more than necessary.

	d. Remove all loose and old stitches from the waistband and lining.
2. Mark the waist.	2. a. Place trousers on table in such a manner that the waist and seat seam lay flat.
	b. Start at the waistband desired measurement, mark and draw a tapered line to a point in the seat seam approximately 9" to 10" down from waistband. This distance will depend on the amount to be taken in or out.
	c. Make certain that the taper starts from the bottom edge of the waistband.
3. Sewing waist seam.	3. a. Start at the upper edge of the waistband and sew down the waist seam following the chalk mark to the point of taper at seat seams, and 1" beyond the point.
	b. To reinforce the seam, sew back up the newly applied seam, up to the waistband and starting point, and apply a tack stitch.
	c. Cut and remove old or original waist seam, from waistband to the point of taper at seat seam, cut excess material if necessary.
	d. Press open waist and seat seam with flat iron.
	e. Place and fold waistband lining into the original position, under the waistband.
	f. Stitch trouser waistband to lining following the old stitch line.
	g. Replace belt loop.

Crotch Alteration:

1. Prepare crotch for alteration.	1. a. Loosen reinforced crotch piece.
	b. Do not damage trouser or crotch piece.
	c. Clean old loose stitches.
2. Marking.	2. a. Lay trousers flat on working table. Fold one trouser leg over body of trouser in such a manner that the inseam of the other leg is laying flat and up.
	b. Starting at the crotch seam and desired measurement mark (This mark should be on the back side of trouser seam) Draw a straight and tapered line down the inseam to a point approximately 18" from the crotch seam.
	c. Follow same procedure for the other leg as shown in paragraph b above.
	d. Make certain that the point of taper on both legs correspond.
3. Cutting and removing trouser seams.	3. a. Cut loose stitching at crotch seam, (only that portion necessary to enable you to make the alteration).
	b. Starting at the crotch seam, cut loose the stitching down the inseam to the point of tapered mark (approximately 18"). This will be accomplished with both trouser legs.
	c. Clean and remove all old loose stitches.

4. Resew trouser seams.

4. a. Start with the right leg of the trousers at a point 1" below the taper.

b. Place the front seam of trouser on the marked line (back of trouser leg) and sew up the inseam to the crotch seam.

c. Make certain that the seam is tacked at both ends.

d. Left leg of trouser start at crotch seam and sew down inseam to 1" below the taper point.

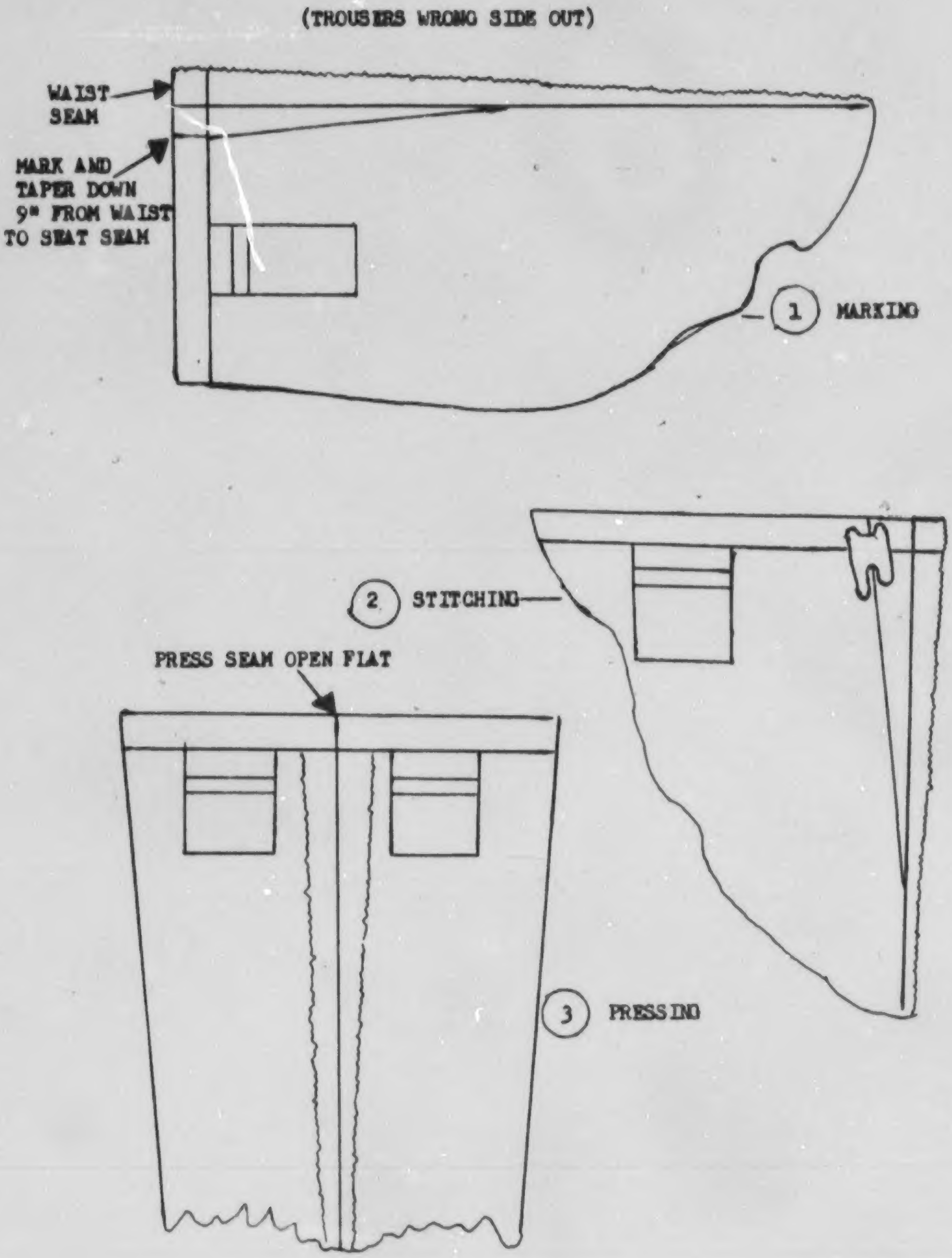
e. Press seams open with flat iron.

f. Cut off excess material.

g. Resew crotch seams, make certain to tack seams at both ends.

h. Resew reinforce crotch piece.

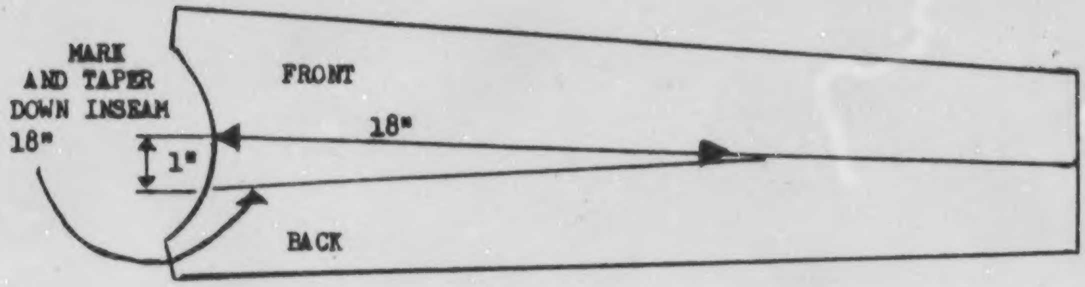
i. Change back crease of trousers with flat iron.


(TROUSERS WRONG SIDE OUT)
WAIST SEAM
MARK AND TAPER DOWN 9" FROM WAIST TO SEAT SEAM
1 MARKING
2 STITCHING
PRESS SEAM OPEN FLAT
3 PRESSING

WAIST AND CROTCH ALTERATIONS
(WOOL TROUSERS)

Figure 19

WAIST AND CROTCH ALTERATION (WOOL TROUSERS) -Continued


MARK
AND TAPER
DOWN INSEAM
18"
FRONT
18"
1"
BACK

(TROUSERS WRONG SIDE OUT)

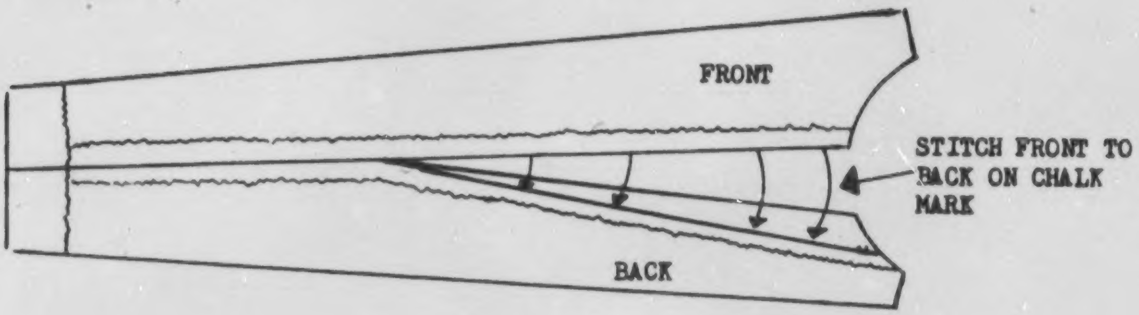
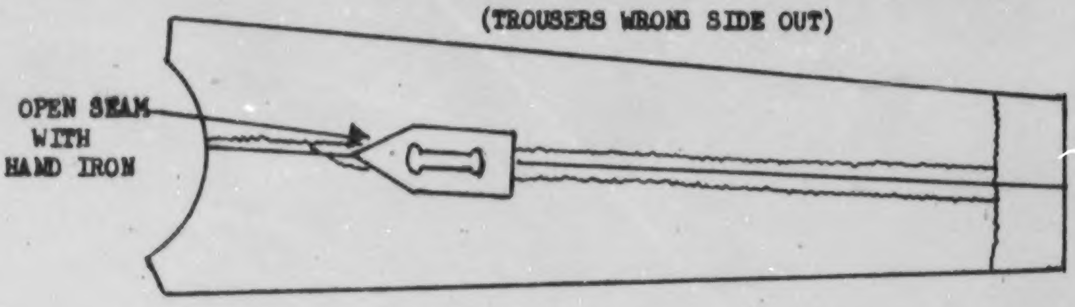

FRONT
STITCH FRONT TO
BACK ON CHALK
MARK
BACK

Figure 19 Cont'd

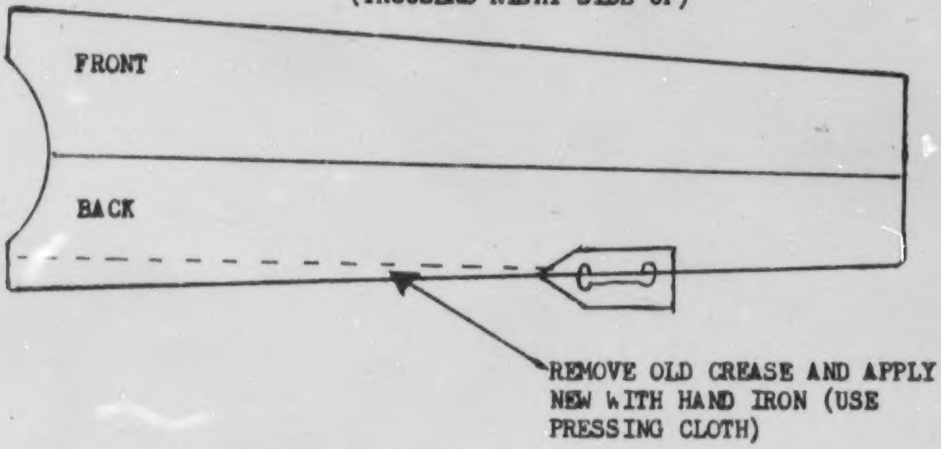
WAIST AND CROTCH ALTERATIONS(WOOL TROUSERS) -Continued

(TROUSERS WRONG SIDE OUT)



OPEN SEAM WITH HAND IRON

(TROUSERS RIGHT SIDE UP)



REMOVE OLD CREASE AND APPLY NEW WITH HAND IRON (USE PRESSING CLOTH)

Figure 19 Cont'd

SECTION XXXXVII

WAIST AND CROTCH ALTERATION OF UTILITY AND KHAKI TROUSERS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the waist and crotch alteration of utility and khaki trousers. This instruction will include taking-in the waist and crotch of utility and/or khaki trousers; measuring, marking, ripping seams, and resewing seams.

2. In the previous subcourse you learned how to perform the waist and crotch alterations on wool trousers. There is a variation in the marking and sewing procedures in the alteration of trousers utility and/or khaki. The variation procedures will be emphasized during this period of instructions.

3. The proper concept of fit for trousers also remains the same as the trousers, wool. The trousers will fit easily around the waist, and bottom of waistband resting on the hipbone. The trouser will also have a slight ease at the crotch. All these factors must be considered when fitting an individual for the waist and crotch alterations.

B. Objective

As a result of this instruction, the student, given appropriate used utility and/or khaki trousers, tailor's chalk, ripper, yard stick, and appropriate measurements for desired waist and crotch alterations, will measure and mark waist and crotch to desired measurements and rip loose the waistband, seat seam, belt loop, and crotch seams; given scissors, will cut off excess material; given a 31-15 sewing machine, appropriate performance standards, and supplies, will resew both crotch seams, waist and seat seams, waistband, and belt loop to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Waist alteration on trousers, utility and/or khaki.

1. Prepare waist.

a. The first step is to remove the belt loop over the waist seam.

b. Care should be taken not to damage the trouser with the ripper.

c. Loosen waistband lining from trousers at top and bottom of waistband. Lining should be loosened approximately three inches to left and three inches to right of waist seam.

2. Marking.

a. Place trousers on table in such a manner that the waist and seat seam are shown face up.

b. From the desired measurement mark, draw a tapering line down the left side of waist and seat seam to a point on the seam (9 inches below the bottom of waistband).

c. Draw another line on the right side of waist and seat seam, tapered down to the point of the first line.

d. The points of the tapering lines should meet on the left side of seam type #4 (folded edge).

3. Ripping seams and cutting waistband.

a. Rip open waist and seat seam down to point of tapering lines. (Seam type #4).

b. Care to be taken not to damage trousers with ripper.

c. Cut the waistband lining apart at a point directly in line the waist seam.

. Sewing waist and seat seams of trousers.

a. Lay trousers on machine in such a manner that both lines marked as face up.

b. Fold material of trousers on marking on right side of trousers and place fold on marking of the left side of trouser.

c. Start at point of taper and stitch up the seat and waist seam to waistband for tacking. This stitch is applied 1/16" from the folded edge.

d. From opposite side of trousers, cut off excess material, allow ½" for turn under of seam.

e. From opposite side of trousers, turn under ¼" of seam and apply a row of stitches 1/16" from the folded edge forming seam type #4.

f. Stitch waistband lining together with a simple seam to the desired measurement. (Stitching of waistband lining should be done from bottom side of lining).

g. Open seams of lining and stitch 1/16" from each side of seams.

h. Fold top portion of waistband and waistband lining to the original fold, and stitch together following old stitch line.

i. Stitch bottom portion of lining and waistband following old stitch line.

j. Replace the belt loop.

B. Operator's maintenance and maintaining DA Form 2404.

1. Check the performance of your sewing machine and make necessary adjustments if required.

2. Make certain to lubricate all oil points of the sewing machine as required. Shuttle race should be lubricated everytime a new bobbin is replaced.

C. Crotch alteration on trousers, utility and/or khaki.

1. Marking.

a. Starting at the crotch seam where desired measurement mark is placed, draw a straight line tapering down the inseam to a point 18" below starting point at crotch seam.

b. This marked line must have a gradual taper and spaced evenly between mark and inseam.

c. Mark down both inseams of each leg following procedures in paragraph a. above.

2. Ripping seams.

a. Starting at crotch seam, rip loose stitches down to the point of taper mark. (18 inches down inseam).

b. Follow the same procedure for the inseam of each leg.

c. Normally seam type #4 is used on utility and/or khaki trousers, therefore, will have two rows of stitching. Care will be taken not to damage the trousers in ripping out the seam.

3. Sewing inseam and crotch seam.

a. The fold of the seam of the front portion of the trousers should lay on the chalk markings made on back of trousers (pin in place).

b. Turn trousers wrong side out.

c. Starting with the left trouser leg, at the point of taper and 1" below the taper, stitch up the inseam up to the crotch seam. From crotch seam sew down the inseam of the right leg to the point of taper, and 1" below.

d. Cut off excess material, allow ½" for seam turn under.

e. Turn trousers right side out.

f. Place trouser on sewing machine in such a manner that the starting point will be the left leg at the tapering point, and 1" below.

g. Turn seam material under ¼", and stitch 1/16" from folded edge, up inseam of left leg to crotch piece, and down inseam of right leg to tapering point and 1" below.

h. With hand iron, press down inseams and crotch seam of the trouser utility.

i. Change back crease of trouser.

WAIST AND CROTCH ALTERATION OF UTILITY AND/OR KHAKI TROUSERS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the proper performance steps followed in making the waist and crotch alteration of the utility and/or khaki trousers. During the demonstration the instructor will explain the key points to be remembered during this alteration. At this time the student will be encouraged to ask questions when in doubt.

II. Study Reference

TM 700-8400-1 "Fitting of Clothing", page 11, fig 5; page 12, par 4.

TM 10-267 "General Repair for Clothing and Textile", page 17, fig 15.

DA Form 2404 "Equipment Inspection and Maintenance Worksheet".

III. Tools, Supplies, and Equipment Required

Salvaged trousers (utility and khaki) (ample supply)

Tailor's tool kit (1 set per student)

31-15 sewing machine (1 per student)

Yardstick (ample supply)

Thread (2 cones per machine)

IV. Direction to Student

During the demonstration the student should listen, observe and ask questions. If during the practical exercise the student is in doubt, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking students practical exercise and inspecting the final results of the alteration for grading purposes.

VI. Job Breakdown

A. The performance standards which have been established and will be used by the instructor for this practical exercise are as follows:

1. Crotch taken in at the proper measurements as specified by the instructor.
2. Waist taken in at the proper measurements as specified by the instructor.
3. Trousers tapered down the inseam 18 inches.
4. Waist tapered down the seat seam 9 inches.
5. Waist and crotch completed without any puckers.
6. Waistband lining properly stitched to trouser at waistband.
7. Belt loop replaced on waist seam.
8. Back crease of trousers changed with hand iron.
9. All stitch lines tacked at each end within deviation standards.

B. The production steps to follow during the practical exercise are listed to the left of the page below, the key points to be remembered and applied are listed to the right of the page.

Waist alteration.

1. Prepare waist for alteration.	1. a. Remove the belt loop, make certain no damage is done to belt.
	b. Place belt loop in pocket of trousers being altered, for safe keeping.
	c. Loosen waistband lining from trousers. Do not loosen any more than necessary.
	d. Remove all loose and old stitches from the waistband and lining.

	e. Cut waistband lining directly in line with waist seam.
2. Mark the waist.	2. a. Place trousers on table in such a manner that the waist and seat seam lay face up.
	b. Start at the waistband desired measurement mark on left side of seam, draw a tapered line from bottom of waistband to a point down the seat seam, (9 inches from bottom of waistband).
	c. Make certain that the marking on the waistband is straight down and that the taper starts at the bottom of the waistband.
	d. Same procedure on right side of seam.
3. Ripping the seams.	3. a. Start at upper top of waistband and rip stitches from waist and seat seam down to point of taper.
	b. Make certain not to damage the trouser.
	c. Clean and remove all old loose stitches from the trousers.
4. Sewing waist and seat seam.	4. a. Fold trouser waist and seat on marking made on right side of seat seam.
	b. Place the fold of the right side of trousers on top the marking of the left side. Pin in place.
	c. Start at the taper point at the seat seam and 1" below, stitch up the seat and waist seam 1/16" from folded edge.
	d. Cut off excess material from seam, allow ½" for seam material.

		e. From opposite side of trouser starting at the taper point at seat seam, fold under ¼" of seam material and stitch up waist seam. This will form seam type #4.
		f. Make certain that all stitch lines are tacked at both ends.
5. Sewing waistband and lining. Replace belt loop.	5.	a. Stitch waistband lining together at desired measurement, with simple seam. (Stitched from back side of lining.)
		b. Open seams of waistband lining and stitch down seam material on both sides of the seam 1/16" from center.
		c. Fold top edge of waistband and waistband lining to its original fold.
		d. Stitch down top of waistband, to lining, following old stitch line.
		e. Stitch down bottom of waistband to lining, following old stitch line.
		f. Replace belt loop.
Crotch alteration.		
1. Marking.	1.	a. Starting at crotch seam at desired measurement, mark down inseam and taper to a point 18" from crotch seam.
		b. This will be accomplished on both trouser leg seams.
		c. Make certain that the marking has a gradual taper.
2. Ripping Seams.	2.	a. Starting at crotch seam, rip loose stitches down to the point of taper (18" down inseam).

b. Follow the same procedures for the inseam of both legs.

c. Normally seam type #4 is used on utility and/or khaki trousers. Therefore, extra care will be taken not to damage the trouser.

3. Sewing Inseam and Crotch Seam.

3. a. Place fold of the seam of front portion of trousers on the marking made on the back portion of the trouser leg. Pin in place.

b. Turn trousers wrong sideout.

c. Starting with the left trouser leg, at the point of taper and 1" below the taper, stitch up the inseam to the crotch seam. From crotch seam down the right trouser leg to the point of taper, and 1" below.

d. Stitching should be 1/16" from folded edge. For best results follow the old stitch line.

e. Cut and trim off excess material, allow ½" for seam turn under.

f. Turn trousers right side out.

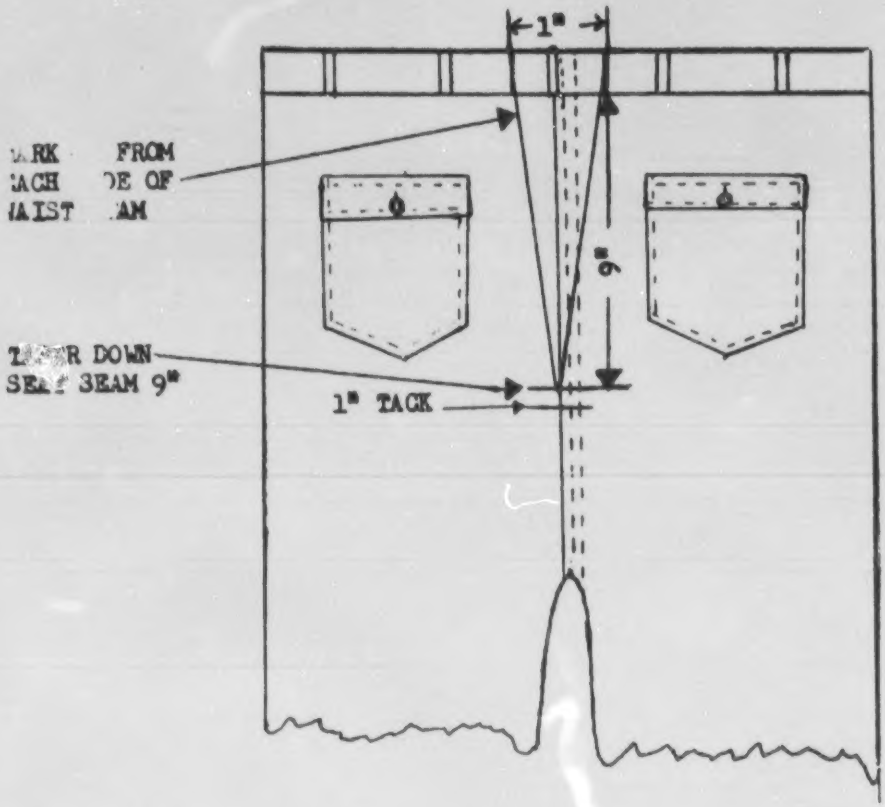
g. Place the trouser on sewing machine in such a manner that the starting point will be the left trouser leg at the tapering point, and 1" below.

h. Turn seam material under ¼" and stitch from folded edge, up inseam of left trouser leg to crotch seam and down inseam of right leg to the tapering point and 1" below.

i. Make certain all stitch lines are properly tacked at each end.

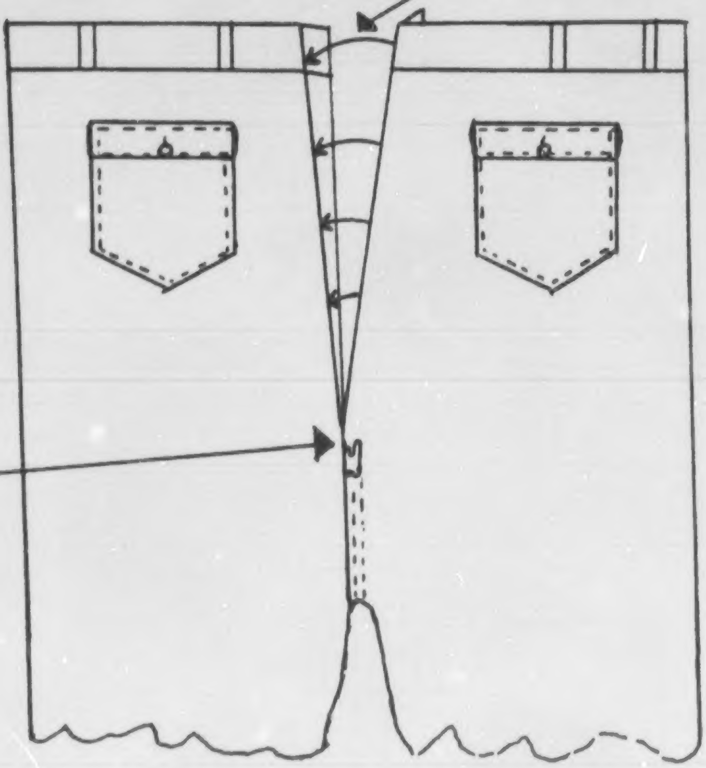
j. Change the back crease of the trouser with hand iron.

Figure 20


1"
MARK FROM
EACH SIDE OF
WAIST SEAM
9"
TAPER DOWN
SEAT SEAM 9"
1" TACK

WAIST AND CROTCH ALTERATION ON TROUSERS
UTILITY AND/OR KHAKI

WAIST AND CROTCH ALTERATION -Continued

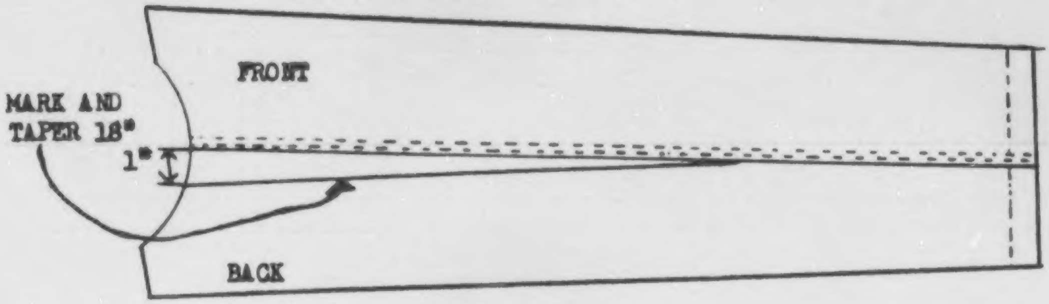


STITCH RIGHT OF TROUSERS
TO THE LEFT SIDE
(SEAM TYPE #4)

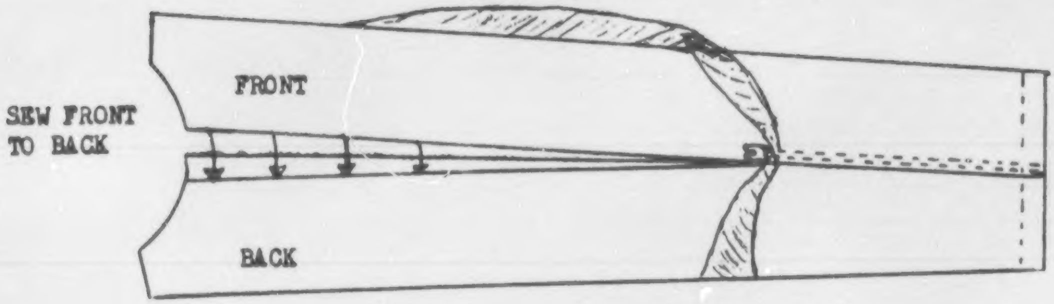
STITCH 1/16"
FROM FOLDED
EDGE

WAIST AND CROTCH ALTERATION - Continued

(TROUSERS FACE SIDE UP)


FRONT
MARK AND
TAPER 18"
1"
BACK

(TROUSERS WRONG SIDE OUT)


FRONT
SEW FRONT
TO BACK
BACK

FOLDED IN SUCH A MANNER THAT THE PRESSER FOOT IS PLACED ON THE STARTING POINT OF TAPER AND SEW UP THE INSEAM.

SECTION XXXXVIII

REPLACING POCKET LININGS AND REPLACING POCKETS OF TROUSERS

PRECIS

1. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedure followed in the replacement of pockets and pocket linings of trousers. This instruction will include ripping the stitches and removing the old pocket, marking and cutting out a new pocket from replacement material, and resewing a new pocket to the trousers.

2. It will be necessary for the student to know the difference in pockets. When the instructor speaks of pocket linings, that is the type of pocket constructed in the khaki or wool trousers. When he speaks of pockets he will be referring to the pockets normally found on the utility trousers, commonly known as "patch" pockets.

B. Objective

As a result of this instruction, the student, given used khaki or wool trousers, appropriate references, ripper, and scissors, will cut old pocket lining from trousers; given pocket lining material, yardstick, and marking chalk, will mark and cut out a new pocket lining, using old pocket lining as a pattern; given a 31-15 sewing machine, appropriate performance standards, and supplies, will sew new pocket lining to trousers to the satisfaction of minimal deviation standards established by the school; given used utility trousers, appropriate references, and a ripper, will rip old pocket from utility trousers; given matching pocket material, tailor's chalk, scissors, and yardstick, will mark and cut out a new pocket, using old pocket as a pattern; using the 31-15 sewing machine and given appropriate performance standards pertaining to the pocket, will resew pocket to utility trousers to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Removing pocket lining from trousers khaki, or trousers AG 44 and AG 344.

1. During this phase care should be taken not to make any further damage to the pocket lining or trousers with the ripper or scissors.

2. You will find two bar-tacking areas on the pocket lining, do not attempt to remove them, but with care of the scissors cut around the bar tack.

3. When removing the waist band stitching, care should be taken so you do not damage the waistband.

4. Remove by ripping only those seams and stitches shown to you during the instructors demonstration.

B. Marking and cutting the new pocket.

1. Placing old pocket lining on replacement material will be an important factor. Material will not be cut on a bias.

2. When cutting, enough material will be required for the seam construction.

3. Long and even cuts of the material is required to avoid rugged edges.

C. Replacing the pocket lining to trousers.

1. This is one time when you do not construct a component part of a garment before you replace it. However, you are constructing the pocket as you sew the lining back to the trousers. If you follow the proper procedures, when completed, it will form a pocket.

2. There are no "short cuts" in this phase, therefore you will be required to observe the instructor's demonstration very closely.

D. Removing pockets from trouser utility.

1. Extreme care must be taken in removing this type of pocket. It is known as a "patch pocket" therefore, is placed on the top facing of the trousers, so any additional damage to the trousers will require additional repairs and effect the appearance of the trousers.

2. When removing the belt loop, make certain it is placed in a secure place so that it won't be lost.

3. In removing the stitches with the ripper, always have a firm grip on it. A loose ripper has a tendency to slip and will damage the trousers.

E. Marking and cutting pockets.

1. Select matching material in shade to the original trousers. Unserviceable trousers will be used as replacement material.

2. Placing pocket on replacement material is important (Do not put on bias).

3. During the marking phase, do not deviate from pattern outline of the pocket.

4. Again, long even cuts with the scissors in cutting out the pocket will eliminate the rugged edges.

F. Replacement of pocket to trouser utility.

1. Placement of pockets on trousers is important. Place and [illegible] pocket on trouser, using old stitch outline as guide.

2. Proper folding of pocket edges should be even and uniform around the pocket edges.

3. Stitching of pocket to the trousers should be of a straight pattern for the proper and neat appearance required when completed.

G. Operator's maintenance and maintaining DA Form 2404.

1. The instructor will continue to emphasize the importance of operator's maintenance. If you continue to perform your operator's maintenance your machine will continue to operate.

2. Use the Operator's Check List and make all necessary recordings on DA Form 2404.

REPLACING POCKET LININGS AND REPLACING POCKETS OF TROUSER

PRACTICAL EXERCISE

I. Introduction

During this period the instructor will demonstrate the production steps used in the replacement of pockets and pocket linings to trousers. During the demonstration he will emphasize on the key points to be remembered during the practical exercise. At this time the student will listen, observe and ask questions when in doubt. Following the demonstration by the instructor, the student will perform a practical exercise in the replacement of pocket and pocket linings.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles," page 15, fig 2; page 16, fig 14; page 19, fig 17.

III. Tools, Supplies, and Equipment Required

Salvaged trousers, utility, khaki, or wool (ample supply)

Tailor's tool kit - (one set per student)

Pocket replacement material (ample supply)

31-15 Sewing machine (one per student)

Thread (2 cones per machine)

IV. Direction to Student

During the demonstration the student should listen, observe, and ask questions. If during the practical exercise the student is in doubt, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking students practical exercise and inspecting the final results of the replaced pockets and pocket linings for grading purposes.

VI. Job Breakdown

A. The performance standards which were established and which will be used by the instructor during and after the practical exercise are listed as follows:

1. Replaced pocket and pocket lining, size and shape conforms with the original.

2. Replacement materials matches the shade of the original trousers.

3. The bar tack stitches applied above and below the pocket openings.

4. Stitch lines applied straigth and evenly spaced around the pockets.

5. Stitches formed properly (lock of stitch center of material, length of stitches 12 to 14 per inch, skipped stitches).

B. The production steps to follow during the practical exercise are listed to the left of the page. The key points to be remembered and which correspond in number to the production steps are listed to the right of the page.

Replacing old pocket lining of trousers (khaki or wool)

1. Remove seams and stitching.	1. a. Remove stitching from waistband above pocket lining.
	b. Stitching on waistband should be cut 1" beyond the width of pocket lining.
	c. Remove old stitches from waistband.

	d. Start at right side of pocket lining, rip seam holding pocket lining to the reinforced side seam.
	e. Start at top of seam and cut towards bottom of pocket lining.
	f. Care should be taken not to damage the pocket lining.
	g. With ripper, cut around the tacking stitches.
	h. Cut and remove stitches holding lining to pocket facing.
	i. Cut and remove stitches from edge of pocket bearer.
	j. With scissors, cut and remove the pocket lining at edge of pocket opening and bearer.
	k. Clean and remove all old loose stitches from waistband, pocket facing, and pocket bearer.
2. Marking and cutting new pocket lining.	2. a. Place pocket lining material on table, folded to a double thickness.
	b. With folded edge of material to the left, place old pocket lining on replacement material.
	c. Place folded edge of old pocket lining on folded edge of replacement material. Mark around right edge of pocket lining and the bottom of pocket lining.
	d. Use a pencil to make your markings so that you can follow the pocket lining outline.
	e. Remove old pocket lining from the replacement material.

f. Keeping your replacement material at double thickness cut around pocket lining outline allowing ½" for seaming purposes.

g. Notch out a strip, off the bottom layer and edge of the pocket lining. Use old pocket lining for correct length and width of notch, all pockets will vary in size.

3. Sewing pocket lining to trousers khaki/or wool.

3. a. Place the notched end of the pocket lining under the pocket bearer.

b. Pin the pocket bearer in place with the pocket lining.

c. Following the old stitch line sew the bearer to the lining, 1/16" from folded edge of bearer.

d. Turn and fold replacement material opposite from the markings. The markings will not be seen when folded properly.

e. At a point just below the pocket bearer, stitch ½" from the pocket lining edge, around the bottom portion of the pocket lining.

f. Tack at the beginning and end of the seam.

g. Turn pocket lining right side up, and roll out edges of the seam.

h. Starting at the top of pocket, just below the waistband, fold under the raw edge of pocket ½" and pin in place to reinforced side seam of trousers.

i. Start at the top of trouser side seam and sew a row of stitches ¼" from fold and stitch around the left and bottom portion of pocket lining.

j. Tack at the beginning and end of the seam.

k. Place top portion of the pocket lining under waistband lining and pin in place. Make certain the pocket lining lays flat with no folds or wrinkles.

l. Turn trousers right side up and pin pocket facing to pocket lining. Make certain the pocket facing lays flat on to the lining.

m. Stitch the pocket facing to the pocket lining, following the old stitch line, 1/16" from the folded edge.

n. From top portion of trousers sew waistband to waistband lining, following the old stitch line.

o. Remove all pins.

Replacing old pocket of trouser, utility.

1. Remove seams and stitches.	1. a. Remove stitches from waistband 1" beyond the pocket.
	b. Remove tack stitches from belt loop and remove the belt.
	c. Secure belt loop, because it will have to be replaced.
	d. Starting at the upper right side of pocket, rip loose all stitches around the pocket.
	e. At the points of tack stitching, take care not to damage the trousers.
	f. Remove the pocket bearer from the pocket. (This is the strip approximately 1" x 7" at the pocket opening.)

	g. Remove all old loose stitches from the trousers.
2. Marking and cutting new pocket.	2. a. Select a matching replacement material for the trouser pocket.
	b. Place replacement material on table face up.
	c. Place old pocket on replacement material, no folds should be in the material or pocket at this time.
	d. Pin the old pocket to the material keeping it in place.
	e. Mark around pocket outline using a fine chalk line. Do not deviate from pocket outline.
	f. Remove pins from pocket pattern (old pocket).
	g. Cut out new pocket, from replacement material, allowing ½" for hemming purpose.
	h. Mark and cut pocket bearer follow steps a. thru g. above.
3. Sew pocket to trouser.	3. a. Sew pocket bearer to the pocket at the opening using seam type #2. 1/16" from folded edge.
	b. Place pocket on trouser using old seam line as guide.
	c. Pin pocket to trouser to keep in place, (approximately 4 pins should be used).
	d. On left pockets, start stitching at upper left of pockets.
	e. Fold material under ½" using old stitch line as guide.
	f. Stitch around pocket down the

left side and across the bottom 1/16" from folded edge.

g. Apply a row of stitches running parallel with the first row of stitches ¼" apart. When completed will have the appearance of seam type #4.

h. On right pockets of the trousers, start the stitching at upper right of pocket and continue procedures as shown in d. thru g. above.

i. Above pocket opening apply a row of stitching from folded edge 1/16". Also apply the second row of stitching, parallel and ¼" from the first stitch.

j. Below the pocket opening, fold under ½" inch hem and apply a row of stitches 1/16" from folded edge.

k. Apply a row of stitches parallel and ¼" from the first row of stitches. At this point continue down the side seam and tack. (Approximately 1" below the pocket.)

l. Fold under ½" material on top of pocket, over the waistband.

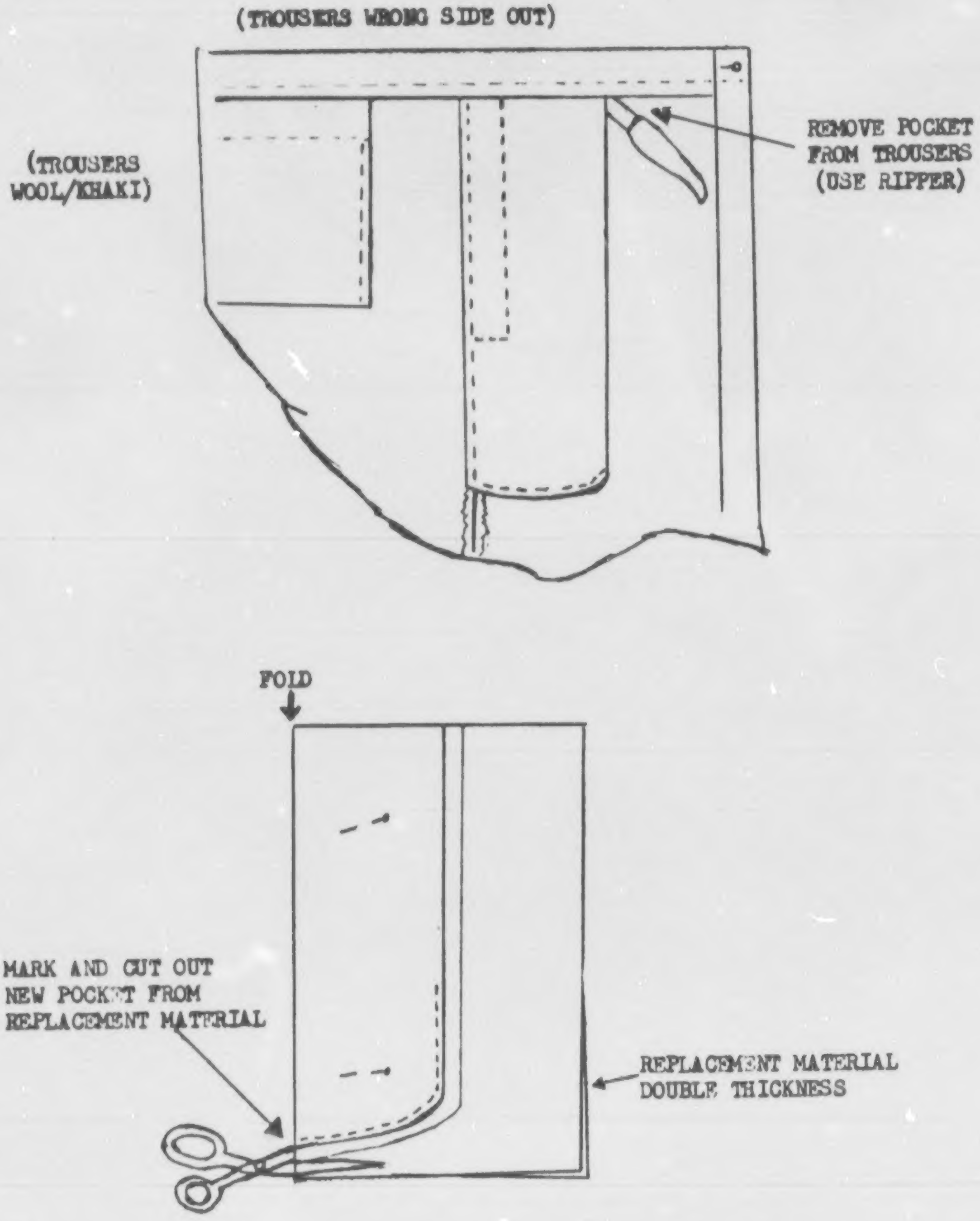
m. Stitch top of pocket following old stitch line on trousers.

n. Sew the second stitch line following old stitch line on trouser at the waistband.

o. Apply tacking stitch above and below the pocket opening.

p. Replace belt loop.

Figure 21

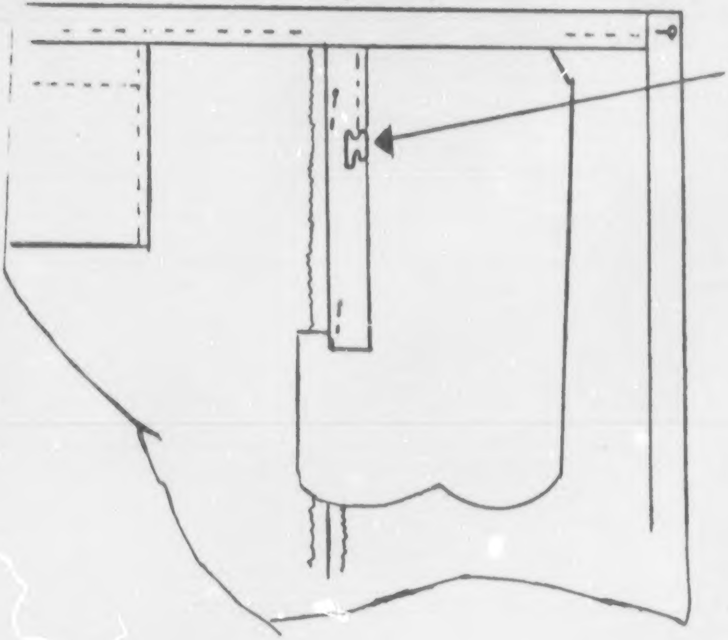

(TROUSERS WRONG SIDE OUT)
(TROUSERS WOOL/KHAKI)
REMOVE POCKET FROM TROUSERS (USE RIPPER)
FOLD
MARK AND CUT OUT NEW POCKET FROM REPLACEMENT MATERIAL
REPLACEMENT MATERIAL DOUBLE THICKNESS

REPLACEMENT OF POCKETS AND POCKET LINING
TROUSERS UTILITY, KHAKI, WOOL

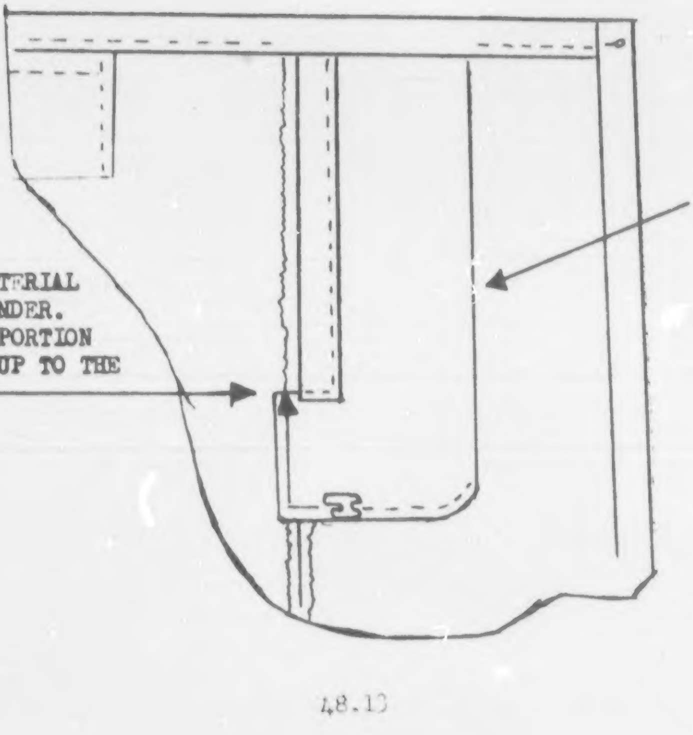
48.953

REPLACEMENT OF POCKETS AND POCKET LINING - Continued

(TROUSERS, WOOL/KHAKI)



OPEN AND SPREAD MATERIAL TO ONE THICKNESS. STITCH POCKET FACING TO REPLACEMENT MATERIAL

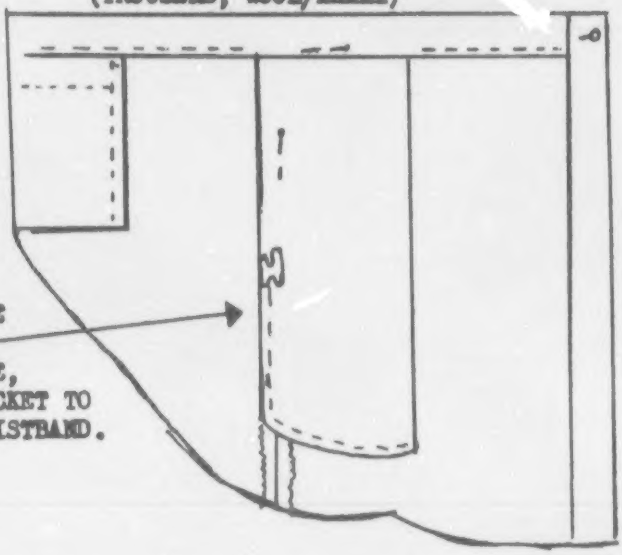


FOLD

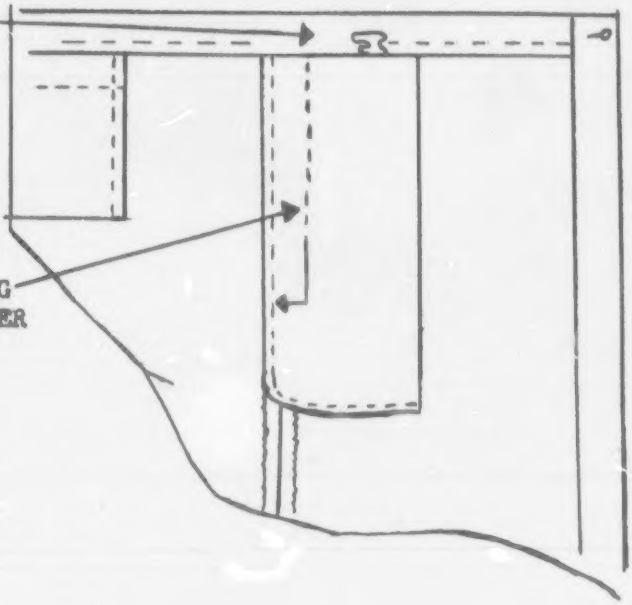
FOLD POCKET MATERIAL IN HALF AND UNDER. STITCH BOTTOM PORTION OF POCKET AND UP TO THE NOTCH.

REPLACEMENT OF POCKETS AND POCKET LINING - Continued

(TROUSERS, WOOL/KHAKI)



TURN POCKET RIGHT SIDE UP. STITCH THE BOTTOM PORTION OF POCKET $\frac{1}{8}$" FROM EDGE, CONTINUE TO SEW POCKET TO SIDE SEAM UP TO WAISTBAND.

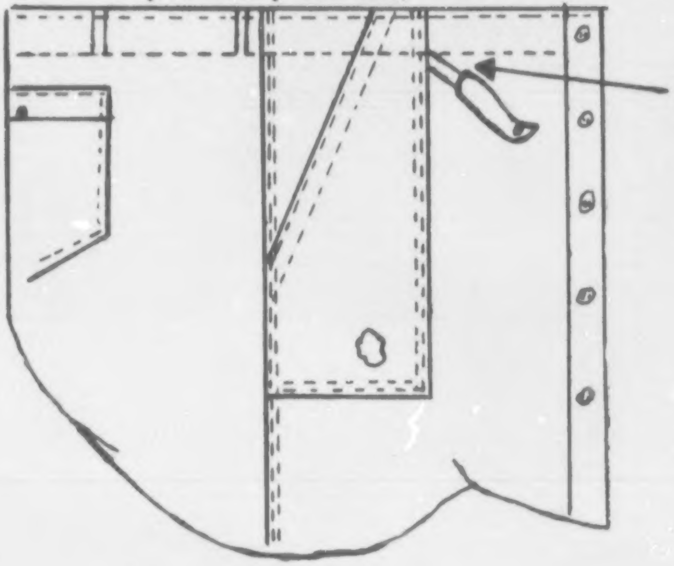


PLACE TOP OF POCKET UNDER WAIST-BAND AND STITCH.

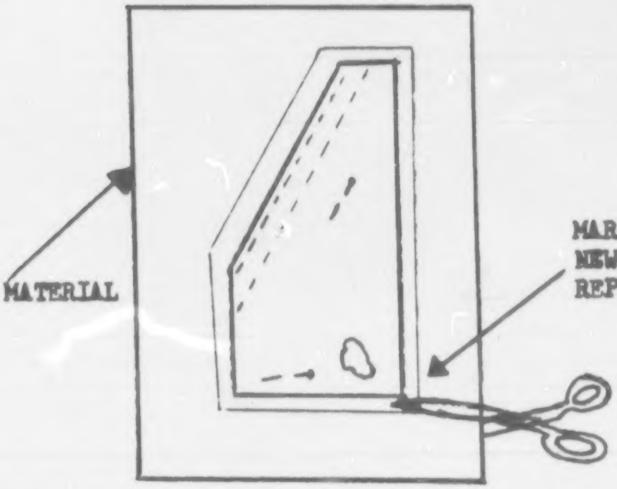
FROM POCKET OPENING STITCH POCKET BEARER TO POCKET

REPLACEMENT OF POCKETS AND POCKET LINING- Continued

(TROUSERS, UTILITY)



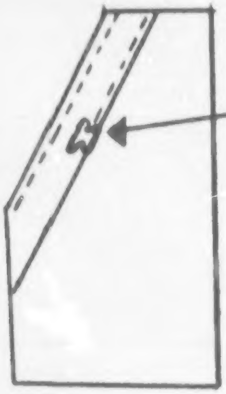
REMOVE POCKET FROM TROUSERS (USE RIPPER)



REPLACEMENT MATERIAL

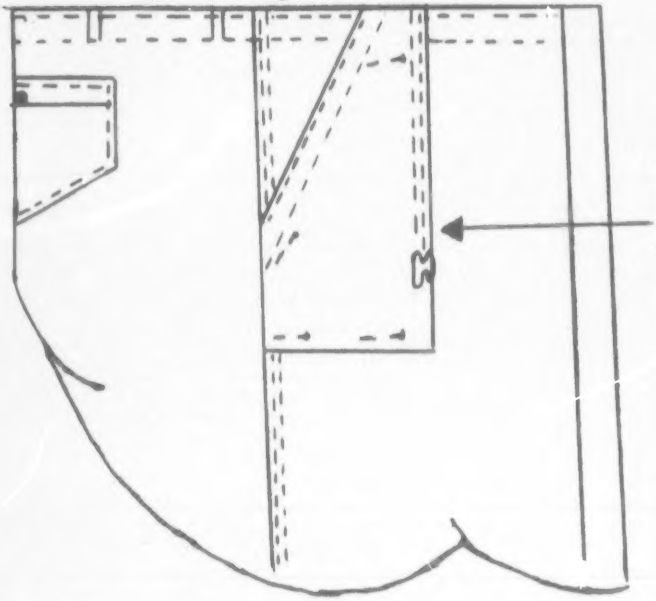
MARK AND CUT OUT NEW POCKET FROM REPLACEMENT MATERIAL

REPLACEMENT OF POCKETS AND POCKET LINING Continued



SEW POCKET FACING MATERIAL TO POCKET OPENING

(TROUSERS, UTILITY)



PLACE AND PIN POCKET IN PROPER POSITION. STITCH POCKET TO TROUSERS WITH TWO (2) ROWS OF STITCHES

SECTION XXXXIX

REPLACING POCKETS AND POCKET FLAPS OF SHIRTS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the replacement of damaged pockets and pocket flaps on shirts. This instruction will include the removal, measuring, marking, cutting and resewing pockets and pocket flaps of a shirt.

2. The use of the pockets on shirts are unlike the use of pockets on the trouser. Since the shirt is an outer garment and worn on the upper part of the body, we find that the pattern and size of the pocket is constructed differently for obvious reasons. A flat constructed pocket on a shirt with flaps, results for a neater appearance and eliminates any use for a large and bulky item.

3. The trouser pocket, you learned, was constructed in such a manner with a primary purpose of serviceability. However, the shirt pocket and flaps are constructed for uniformity and appearance.

B. Objective

As a result of this instruction, the student, given used shirts, appropriate references, and ripper, will rip old pocket and pocket flap from shirt; given matching material, tailor's chalk, yardstick, and scissors, will mark and cut out a new pocket and pocket flap, using old ones as a pattern; given 31-15 sewing machine, appropriate performance standards, and supplies, will sew new pocket and pocket flaps to shirt to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Remove pockets and pocket flap from shirts.

1. The first step in replacing a damaged pocket is to remove the pocket and flap.

2. Take all necessary precautions in removing the pocket and flap, a slip of the ripper may cause additional damage to the shirt.

3. Slow and even cutting of the stitches is required with no additional pulling on the pocket or flap for this has a tendency to pull it out of shape.

4. Remove all old loose stitches from shirt.

B. Marking and Cutting of shirt pockets and flap.

1. The replacement material must be of the same shade of the shirt, a differential in color or shade of a pocket or flap can be more noticeable than a damaged pocket or flap.

2. Place the old pocket on the replacement material, both material and pocket face up.

3. Pin the pocket to the replacement material, this will keep it in place.

4. If the pocket is a pleated pocket stretch and lay it out to the full length. (Pleated pockets will be found on the short sleeve, khaki shirt).

5. Mark around the pocket outline with tailor's chalk.

6. Add an additional 1½" at top portion of pocket. This additional material will be used for the top pocket hem.

7. Cut out new pocket from the replacement material, allow ½" from pocket outline for hemming purpose.

8. Pin the pocket flap to the replacement material. Material will be of double thickness and face to face.

9. Mark around the pocket flap outline. Use a fine chalk line.

10. Cut around the pocket flap outline, allow ½" for the seam or hemming purpose.

11. Stitch at both ends and bottom of pocket flap outline. Tack beginning and end of seam.

12. Turn pocket flap right side out or face up.

13. Stitch both ends and bottom of pocket flap 1/4" from edge, forming seam type #6.

C. Replacing pocket and flap to the shirt.

1. Pin the pocket to the shirt, using old stitch line as a guide.

2. Fold under the edges of the pocket, and stitch pocket to the shirt 1/4" from the folded edge.

3. Place the flap on the shirt, parallel with top of pocket and following old stitch line.

4. Sew the pocket flap to the shirt using seam type #3.

5. Sew even straight stitches to maintain a neat appearance. Tack all seams used, for the purpose of durability.

D. Operator's Maintenance and maintaining DA Form 2404.

1. As in previous hours, you are required to perform operator's maintenance on the sewing machine. To operate properly it must have the proper maintenance.

2. Make all necessary recording on the DA Form 2404.

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REPLACING POCKETS AND POCKET FLAPS OF SHIRTS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the production steps and explain the key points to be remembered when replacing pockets and pocket flaps of a shirt. Following the demonstration, the student, will perform a practical exercise in replacing pockets and pocket flaps. At this time the student is encouraged to ask questions when in doubt and also to call on the instructor for assistance when needed.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles" Page 15, fig 13; Page 16, fig 14; Page 19, fig 17.

III. Tools, Supplies, and Equipment Required

Salvaged shirts (ample supply)

Tailor's tool kit (1 set per student)

31-15 Sewing Machine (1 per student)

Replacement Material (ample supply)

Thread (2 cones per machine)

IV. Direction to Student

During the demonstration the student should listen, observe, and ask questions. If during the practical exercise the student is in doubt, do not hesitate to call on the instructor for assistance.

V. Performance Standards

The performance standards are established to be used by the instructor in checking students practical exercise and inspecting the final results of the replaced pocket and pocket flaps of the shirt for grading purposes.

VI. Job Breakdown

A. The performance standards which were established and which will be used by the instructor during and after the practical exercise are listed as follows:

1. Pocket and pocket flap conforms with original, in size and shape.

2. Replacement materials matches in shade of the original shirt.

3. Stitches evenly spaced and applied straight..

4. Stitches properly formed (lock of stitch in center of material, no skipped stitches, length of stitch 12 to 14 per inch).

5. Stitch lines tacked in the proper areas and in length in accordance with minimal deviation standards.

B. The production steps to follow during the practical exercise are listed to the left of the page. The key points to be remembered and which correspond in number to the production steps are listed to the right of the page.

Replacing Pockets & Pocket Flaps

1. Removing Old Pockets and Flaps from Shirt.	1. a. Remove stitching from pockets, be careful at top portion of pocket, stitches may be tight or tacked.
	b. Use a sharp blade in cutting stitches, cut slow with no unnecessary pull or strain on the pocket.
	c. Clean all loose stitches from the shirt.

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d. Remove stitching from pocket flap. The flap is double stitched therefore, take all precautions in not damaging the shirt.

e. Remove all loose stitches from the shirt.

2. Marking and Cutting New Pocket and Flap.

2. a. Select proper size and shade of replacement material.

b. Lay material on table face up.

c. Place and pin the old pocket to replacement material.

d. Mark around old pocket outline, use a fine chalk mark.

e. At the top of pocket, mark an additional 1½" for hemming purposes.

f. Remove pins and pocket from the replacement material.

g. Cut out new pocket from the replacement material allowing ½" additional material for hemming.

h. Fold replacement material on table, double thickness, face to face.

i. Pin and place the pocket flap on the replacement material.

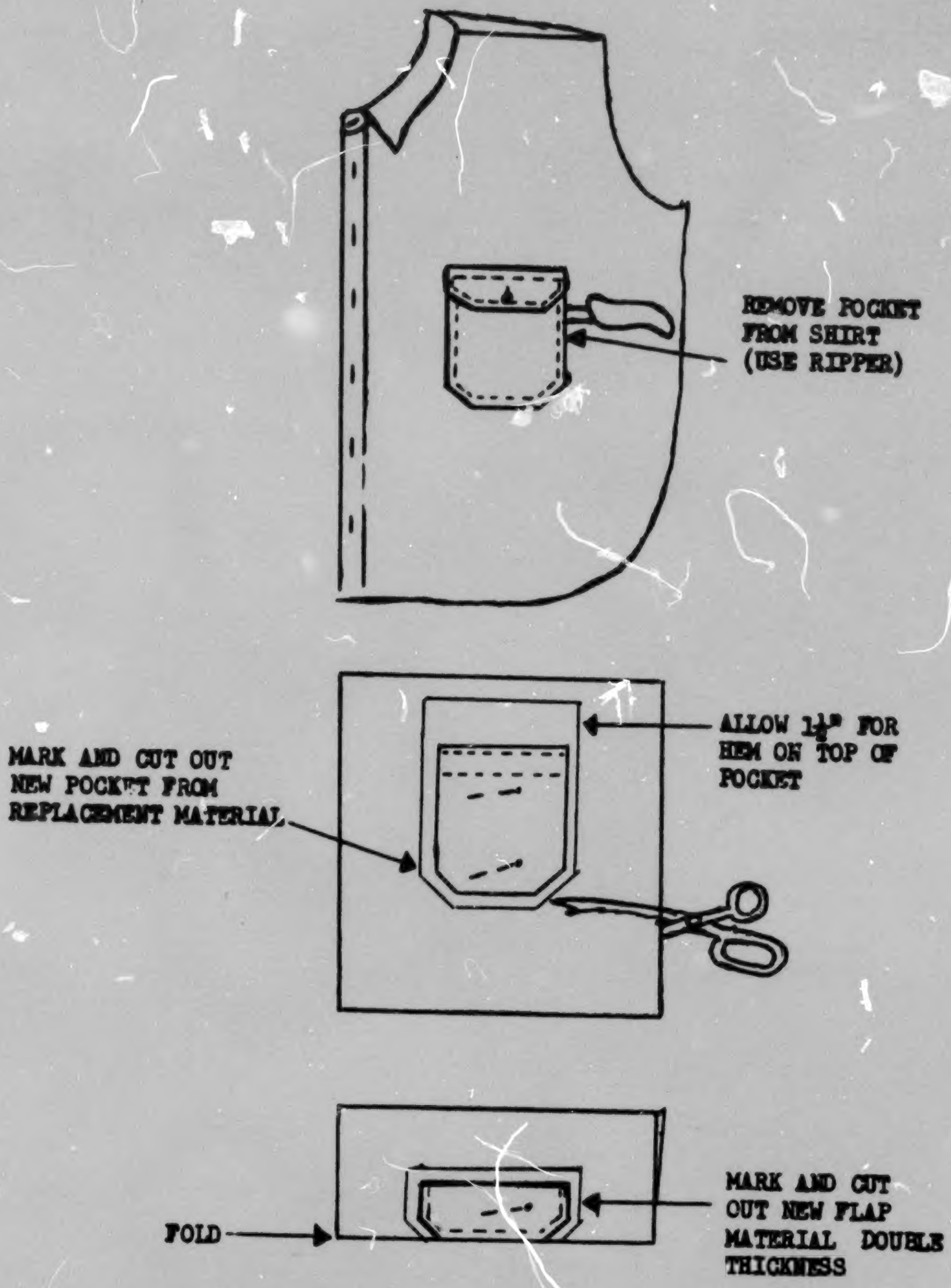
j. Mark around old pocket flap, use a fine chalk mark.

k. Remove pins and pocket flap from the replacement material.

l. Cut out new pocket flap from replacement material, allow ½" for seaming and hemming.

3. Replacing new pocket on shirt.	3. a. Sew 1" hem across top of pocket.
	b. Pin the pocket onto the shirt using old stitch line has a guide.
	c. Fold under edges of pocket, stay on chalk marks.
	d. Start at upper right of pocket and stitch around the pocket ¼" from folded edge.
	e. Make certain to tack at the beginning and end of each seam.
	f. Place pocket flap on shirt. It will be necessary to center and align with the top of pocket.
	g. Sew pocket flap to the shirt using seam type #3.
	h. Check all seams for tacks, appearance and workmanship of the pocket and pocket flap.

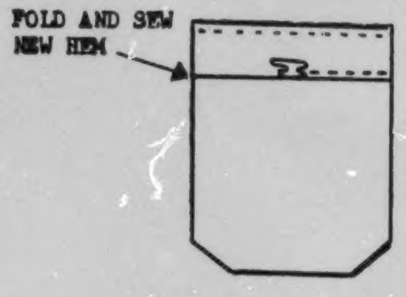
Figure 22

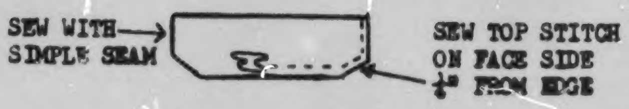

REMOVE POCKET
FROM SHIRT
(USE RIPPER)
MARK AND CUT OUT
NEW POCKET FROM
REPLACEMENT MATERIAL
ALLOW 1½" FOR
HEM ON TOP OF
POCKET
FOLD
MARK AND CUT
OUT NEW FLAP
MATERIAL DOUBLE
THICKNESS

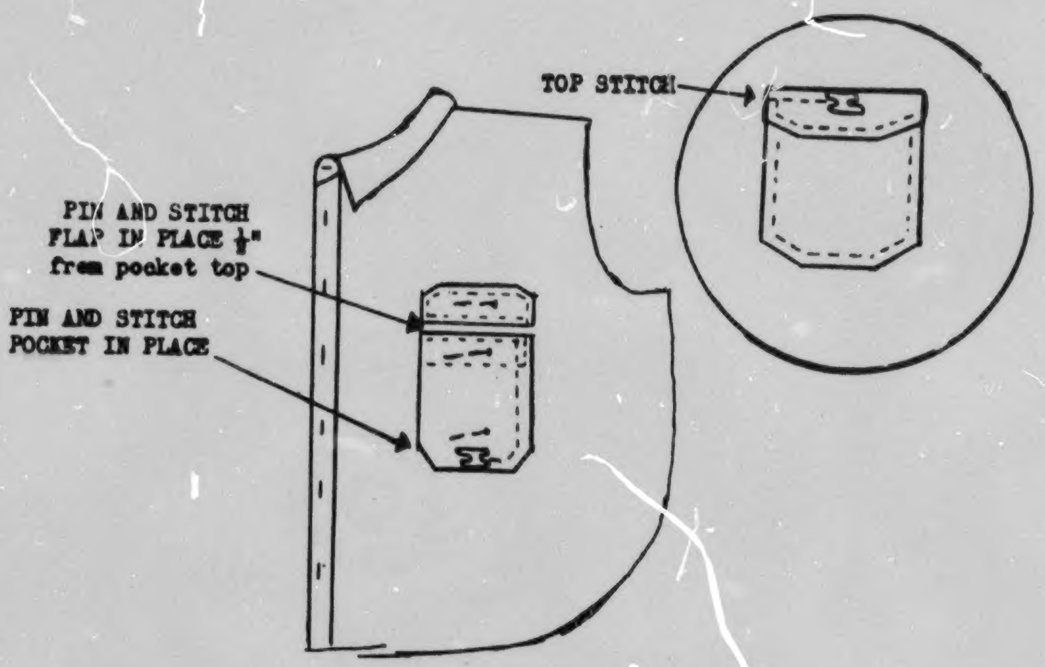
REPLACEMENT OF POCKET AND POCKET FLAP

49.08

REPLACEMENT OF POCKET AND POCKET FLAP- Continued


FOLD AND SEW
NEW HEM


SEW WITH
SIMPLE SEAM
SEW TOP STITCH
ON FACE SIDE
1/8" FROM EDGE


TOP STITCH
PIN AND STITCH
FLAP IN PLACE 1/8"
from pocket top
PIN AND STITCH
POCKET IN PLACE

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SECTION I

CONSTRUCTION OF COLLARS ON UTILITY JACKETS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the procedures to be followed in the construction and replacement of collars on the utility jacket. This instruction will include measuring, marking, cutting out a new collar from replacement material, sewing a new collar, and replacing the newly constructed collar to the utility jacket.

2. Since the collar is located at the top portion of the garment, it is constantly exposed to wear by rubbing of the neck and collar, in some instances may become worn beyond repair. In most cases you will find that a garment is completely serviceable throughout the body except for a worn collar. A garment with a badly worn collar normally will be classified as unserviceable, until necessary repairs are made.

3. Since your job is to extend the life of a garment, in this case a utility jacket, you will remove the damaged collar, construct a new collar, and replace it to the jacket. When completed the collar will have the appearance and workmanship of the original collar. This will only be accomplished by following the procedures and instructions presented to the student by the instructor.

B. Objective

As a result of this instruction, the student, given a used utility jacket, appropriate references, and ripper, will rip old collar from jacket;

given matching material, tailor's chalk, yardstick, and scissors, will mark and cut out a new collar, using old one as a pattern; given a 31-15 sewing machine, appropriate performance standards, and supplies, will stitch around new collar and sew new collar to the jacket to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Removing collar from utility jacket.

1. When removing the collar care should be taken not to make any further damage to the collar or body of the jacket.

2. A firm grip on the ripper and a slow cutting motion of stitches will enable you to remove the collar without difficulty.

B. Marking and cutting new collar

1. Select replacement material for the new collar matching in shade and wear as the original jacket. Material will be taken from an unserviceable jacket.

2. Amount of material to be used will be determined by the width and length of the collar, also allowing enough material for seams.

3. Using the old collar as a pattern, make certain that you hold it in place (by use of pins) in order to get the true collar outline. A mismarked collar can result with an uneven appearance, too long or too short.

4. In cutting out the new collar outline, care should be taken to follow the chalk markings, also allowing enough material for the seams and hems.

C. Sewing the collar.

1. In sewing the collar the replacement material is first sewn the simple seam following the chalk marks made.

2. Collar material is then turned face up, making certain that points are pushed out as much as possible.

3. The top stitching is applied ¼" from the edge of collar at the top and each end, turning the original simple seam to a finished seam type #6.

D. Replacing collar by sewing to jacket.

1. Place under collar portion on body of jacket. Starting at the left side of jacket, sew the under collar to the body of the jacket with a simple seam. Care should be taken not to pull or stretch the material.

2. Stitch top portion of collar by folding under ½" hem to a finished seam type #5.

3. All stitching should be applied even and straight and all tacking stitches neatly applied.

E. Operator's maintenance and maintaining DA Form 2404.

1. As a reminder at this time, we will again emphasize the importance of operator's maintenance. So keep your machine in operation by performing your operator's maintenance.

2. Use the operator check list and make all necessary recordings on the DA Form 2404.

CONSTRUCTION OF COLLARS ON UTILITY JACKETS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will explain and demonstrate the production steps to be followed in the construction of collars on utility jackets. Following the demonstration by the instructor the student will perform a practical exercise in the construction of collars on the utility jacket. At this time the student is encouraged to ask questions when in doubt, and to call on the instructor for assistance when needed.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles", Page 19, fig 17; Page 18, fig 16.

III. Tools, Supplies, and Equipment Required

Salvaged Utility Jackets (ample supply)

Tailor's Tool Kit (1 set per student)

31-15 Sewing Machine (1 per student)

Thread (2 cones per machine)

Replacement Material (ample supply)

IV. Direction to Student

During the demonstration, the student will listen, observe, and ask questions. During the practical exercise the student is encouraged to call on the instructor for assistance when in doubt.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student performance during the practical exercise. The instructor will also inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established which were established and to be followed by the instructor are listed below:

1. Collar size and shape conforms with that of the original collar.
2. Edges of the collar rolled out properly.
3. Stitches and seams evenly spaced around the collar outline.
4. Replacement material matches in shade of the original jacket.
5. Seams properly tacked, length as required in accordance with minimal deviation standards.
6. There should be no puckers in the collar or seam joining collar with jacket.

B. The production steps to be followed during the student practical exercise are listed to the left of the page below. The key points to be remembered and applied are listed to the right of the page.

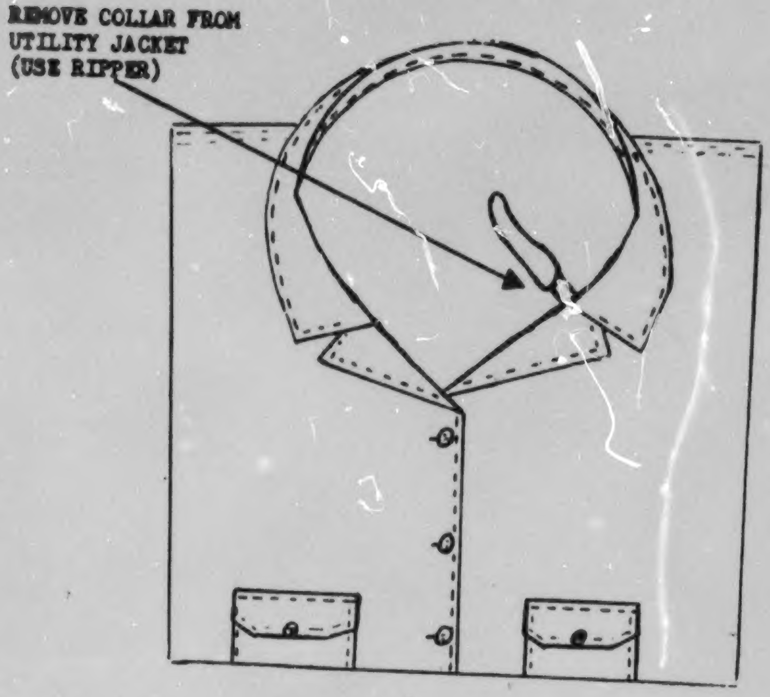
Removing collar from utility jacket.

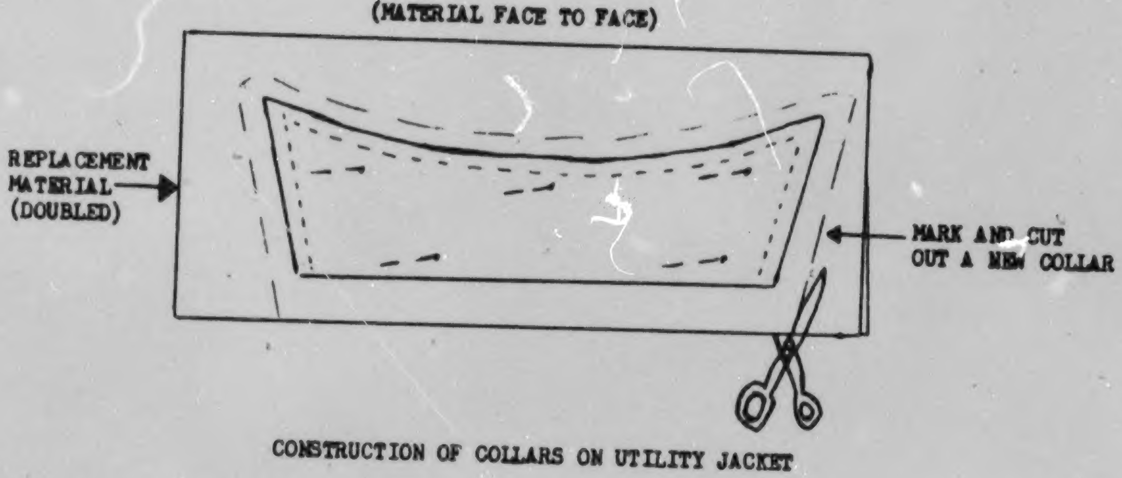
1. Remove collar from body of shirt.	1. a. Use a firm grip on the ripper knife so as not to make any further damage to the collar or jacket. b. Cut the stitching slow and avoid any unnecessary stretching of the collar or jacket. c. Remove all old stitches from the jacket.

2. Select and prepare replacement material.	2. a. Select material of the proper shade to match the jacket.
	b. Fold and place replacement material on table face to face.
	c. Place collar on replacement material and pin collar to material making certain that both replacement material and collar are laying flat.
3. Marking of collar outline.	3. a. Use one hand to hold materials in place. For best results pin the collar to the material.
	b. Mark around outline of collar using tailor's chalk. Be certain that both points of the collar are marked in uniformity.
	c. For a true collar outline use a fine marking line.
4. Cutting out new collar from replacement material.	4. a. Remove old collar from the replacement material.
	b. Keeping the replacement material folded and in tact, pin the material together (still face to face).
	c. With even cuts of the scissors, cut ½" from the markings of the collar outline.
5. Stitching the collar pieces together.	5. a. Simple seam around collar outline, stay on chalk mark with the stitching.
	b. Make certain that you tack at the beginning and end of each seam. Tack length should be within Deviation Standards.
6. Turn collar right side out.	6. a. Turn collar out, face side out. Make certain that you have notched out excess material from collar points before turning the collar.

	b. Use the point of the scissors or pencil to push out the collar points.
	c. With tip of fingers roll out the edges and points of the collars.
7. Stitch around collar edge.	7. a. Make certain the collar is laying flat and all edges and collar points are rolled out even.
	b. Stitch around the collar ¼" from the edge.
	c. Tack at the beginning and end of the seam. Length of tack within deviation standards.
8. Attach collar to body of jacket.	8. a. Make certain the collar is positioned equal distance from the center front.
	b. Join collar with jacket using simple seam.
	c. Tack at beginning and end of the seam. Length of tack within deviation standards.
9. Sew top portion of collar.	9. a. Fold material over just beyond the first stitching.
	b. Make certain the fold is even and straight across the collar.
	c. Stitch 1/16" from edge of fold across the collar.
	d. Tack at beginning and end of seam, within deviation standards.

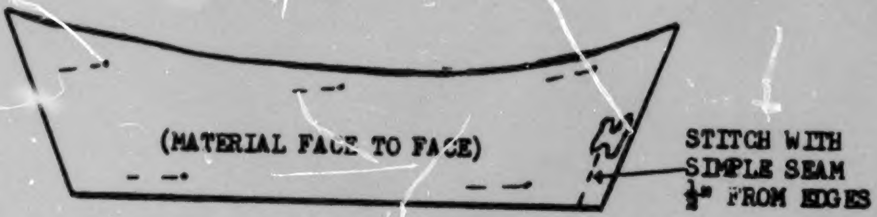
Figure 23

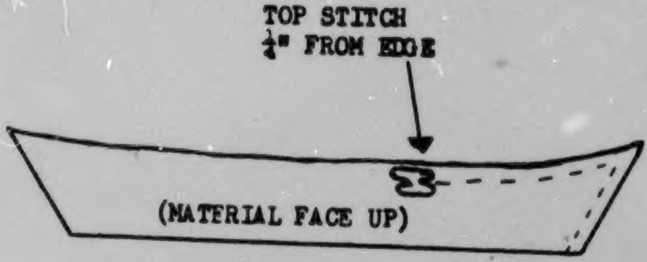

REMOVE COLLAR FROM
UTILITY JACKET
(USE RIPPER)

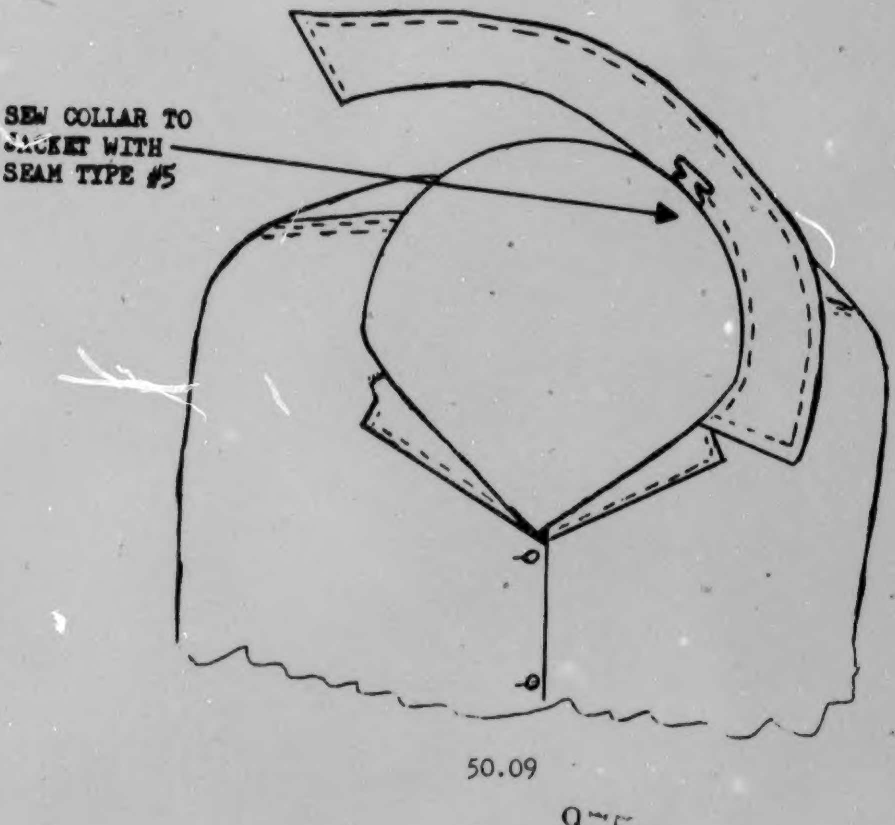

(MATERIAL FACE TO FACE)
REPLACEMENT
MATERIAL
(DOUBLED)
MARK AND CUT
OUT A NEW COLLAR

CONSTRUCTION OF COLLARS ON UTILITY JACKET

CONSTRUCTION OF COLLARS ON UTILITY JACKET- Continued


(MATERIAL FACE TO FACE)
STITCH WITH SIMPLE SEAM ½" FROM EDGES


TOP STITCH ¼" FROM EDGE
(MATERIAL FACE UP)


SEW COLLAR TO JACKET WITH SEAM TYPE #5

SECTION LI

CONSTRUCTION OF EPAULETS ON SHIRTS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the procedures to be followed in the construction and replacement of epaulets on shirts. This instruction will include removing the damaged epaulet, measuring, marking, cutting and resewing the newly constructed epaulet to the shirt.

2. The epaulet is found on the shoulder seam of a shirt, at a point where the back and front of a shirt are joined together with a seam. The epaulet is better known by most people as a "shoulder loop" or a "shoulder tab." In addition to the shirt, the epaulet can be found on the field jacket, overcoat, and coats AG 44 and AG 344.

3. Since the epaulet is a component constructed on a outer garment, every effort should be made to construct and replace it with material of a matching shade as the original garment. It is also necessary that it retains its original shape when completed.

B. Objective:

As a result of this instruction, the student, given used khaki shirts, appropriate references, and ripper, will rip old epaulet from shirt; given matching material, tailor's chalk, yardstick, and scissors, will mark and cut out a new epaulet, using old one as a pattern; given a 31-15 sewing machine, appropriate performance standards, and supplies, will stitch around new epaulet to shirt to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form.

II. Presentation

A. Removing damaged epaulet from the shirt.

1. Cut stitches holding epaulets to shoulder seam (2 rows of stitching).

2. Take extreme caution when cutting the stitches with the ripper. Do not make any further damage to the shirt, as since it is an outer garment further damage will make it unserviceable.

3. Remove all old loose stitches from the shirt.

B. Marking and cutting new epaulet.

1. Exercise care to match the shade of material.

2. Place epaulets on 2 pieces of replacement material and face to face.

3. Mark around epaulets outline with a fine chalk mark. Using a fine chalk mark will enable you to have a completed epaulet of the proper size and design.

4. Remove epaulets from the replacement material, cut out new epaulet from the material allowing $\frac{1}{2}$" for seams.

C. Constructing new epaulet.

1. Stitch around outline of epaulet following the chalk marks.

2. Turn epaulet material right side or face side out.

3. Roll out stitched edges of the epaulet, push out point of epaulet with point of scissors or a pencil.

4. Stitch around epaulet $\frac{1}{4}$" from the stitched edge forming seam type #6.

D. Replacing the epaulet to the shirt.

1. Set the epaulet squarely on shoulders, covering the shoulder seam and pin in place.

2. Point of epaulet should be ½" from the collar seams.

3. Stitch the epaulet to shirt on seam joining the shoulder with the sleeve. Use two (2) rows of stitches.

4. Make certain to tack all seams.

E. Operator's Maintenance and Maintaining DA Form 2404.

1. The student as operator should lubricate all oil points of the sewing machine.

2. When in doubt of the performance of the sewing machine, call on the instructor for assistance.

3. Maintain the DA Form 2404 as required.

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CONSTRUCTION OF EPAULETS ON SHIRTS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the production steps in removing, constructing, and replacement of the epaulet to the shirt. Following the demonstration the student will perform a practical in the construction and replacement of epaulets on the shirt. During this period the student is encouraged to ask questions when in doubt.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles" Page 19, fig 17.

III. Tools, Supplies, and Equipment Required

Salvaged khaki shirts (ample supply).

Tailor's tool kit (1 set per student).

31-15 sewing machine (1 per student).

Replacement material (ample supply).

Thread (2 cones per machine).

IV. Direction to Students

During the demonstration the student will listen, observe, and ask questions. During the practical exercise the student is encouraged to call on the instructor for assistance when in doubt.

V. Performance Standards

The performance standards are established to be used by the instructor for checking student performance during the practical exercise. The performance standards will also be used in inspecting the final results for grading purposes.

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VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Replacement material of the proper shade as that of the original shirt.

2. Point of epaulet placed ¼" from the collar seam.

3. Seams and top stitch evenly spaced around the epaulet.

4. Edge of epaulet properly placed and sewn on sleeve and shoulder seam.

5. Tack stitch applied in accordance with the minimal deviation standards.

6. Stitches properly formed (lock of stitch in center of material, no skipped stitches, length of stitch 12 to 14 stitches per inch).

B. The production steps to be followed in the construction and replacement of epaulets on shirts are listed to the left of the page. The key points that will be emphasized and applied during the practical exercise are listed to the right of the page.

Construction of Epaulets on Shirts.

1. Remove epaulet from shirt.	1.	a. Cut stitches that joins the epaulet with the shirt.
		b. Use extreme care not to damage the shirt.
		c. Clean all old loose stitches from the shirt.
2. Marking and cutting new epaulet.	2.	a. Select a matching replacement material as the original shirt.
		b. Place two pieces of material on table, face to face.

	c. Place and pin epaulet to replacement material.
	d. Mark around epaulet with tailor's chalk. Use a fine chalk mark for better results.
	e. Remove epaulet and cut out new epaulet from replacement material. Allow ½" from mark for seam purpose.
3. Sewing new epaulet.	3. a. Stitch seam around epaulet outline. Do not deviate from the chalk marks.
	b. Make certain the seam is tacked at each end.
	c. Turn epaulet face side out, use point of scissors or pencil to push out the point of the epaulet.
	d. Roll out the stitched edges of the epaulet.
	e. Stitch a seam around the epaulet ¼" from the stitched edges. Seam should be even and straight and have the appearance of seam type #6.
4. Sewing epaulet to shirt.	4. a. Place and pin epaulet squarely over the shoulder seam.
	b. Point of epaulet should be ¼" below the collar seam.
	c. Turn under raw edges of epaulet at the sleeve seam.
	d. Stitch seam, starting at a point one (1) inch below the epaulet and stitch 1/16" from the folded edge across the epaulet.
	e. Sew a second row of stitches parallel with the first stitch ¼" apart, when the stitching is completed it will have the appearance of seam type #4.

f. Make certain to apply tacking stitch to all seams, in compliance to minimum deviation standards.

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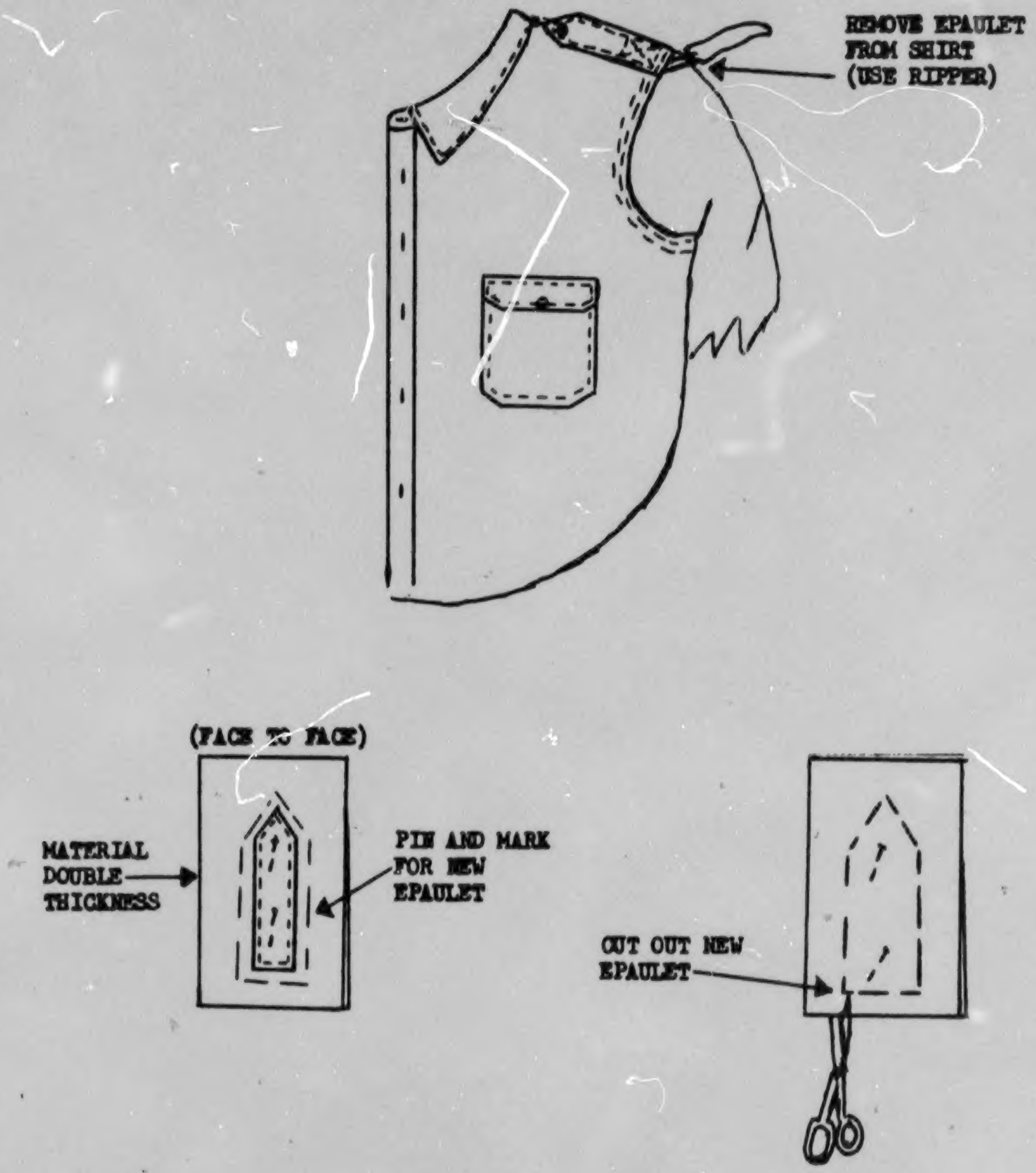
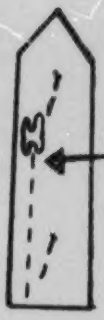
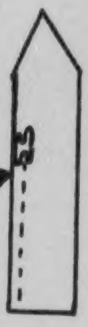
Figure 24

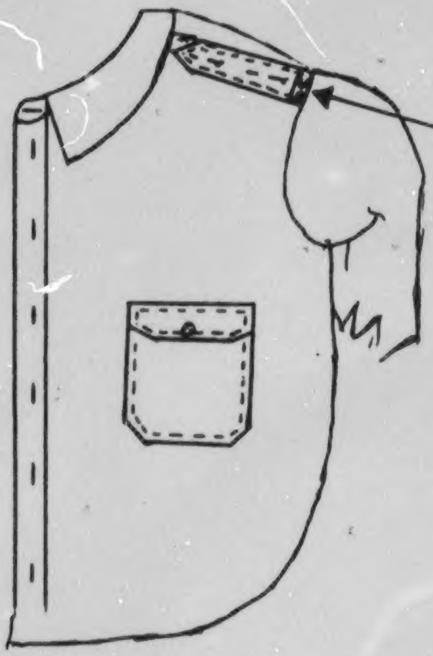

REMOVE EPAULET
FROM SHIRT
(USE RIPPER)
(FACE TO FACE)
MATERIAL
DOUBLE
THICKNESS
PIN AND MARK
FOR NEW
EPAULET
CUT OUT NEW
EPAULET

CONSTRUCTION OF EPAULETS ON SHIRT

CONSTRUCTION OF EPAULETS- Continued


MATERIAL
FACE TO
FACE
WITH SIMPLE SEAM
STITCH ½" FROM
EDGE


TOP STITCH
¼" FROM
EDGE
MATERIAL
FACE SIDE
UP


SEW EPAULET TO
SHIRT (TWO ROWS
OF STITCHES)

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SECTION LII

SHORTENING SLEEVES OF OVERCOATS OR COATS WOOL

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss shortening sleeves of the overcoats or coats wool. This instruction will include measuring and marking at the desired length, basting the lining and hem in place, cutting off the excess material, sewing a new hem and replacing the lining by hand sewing.

2. Here again it is important that you refer back to the instructions previously discussed during this course on "Fitting of Clothing" (Section VI). The alteration should be performed in accordance with the concept of fit as specified in this section.

3. Normally when the sleeves of a garment are too long for an individual, it not only brings discomfort and effects the appearance, it also will cause excessive wear to the coat at the edge of the sleeve. Sleeves of the proper length will, without a doubt, extend the life of a garment.

B. Objective

As a result of this instruction, the student, given used wool overcoat or coat, yardstick, tailor's chalk, and appropriate references, will mark wool overcoat or coat to desired length; given hand sewing needle and appropriate supplies, will baste lining of coat to the sleeve; given ripper, will rip old stitches loose from lining and sleeve; given scissors, will cut off excess material; given performance standards, will hand sew lining to sleeve and remove basting stitches to minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Types of Stitches Used - During this period the alteration of the coat sleeve will be performed by a combination of the basting stitch and the cross stitch.

1. Basting Stitch - A temporary stitch, will be used to hold lining in place until the completion of the alteration. It will also be used to keep hem in place until the permanent type stitch is applied. The basting stitch will be removed upon completion of the alteration and the sleeve has been pressed.

2. Felling Stitch - The permanent type stitch that will be used to sew the bottom edge of the lining to the coat sleeve.

B. Measuring and Marking

1. The measurement to the desired length must be accurate. The best method used to attain the proper length is to have the individual try on the coat, and sleeves marked in accordance with the concept of fit as prescribed in the current regulations.

2. The markings for hemming purposes is equally important. All markings should be straight and evenly spaced around the sleeve bottom at the desired length. Width of hem should be uniform around the sleeve (2" hem).

C. Basting and Preparing Hem.

1. Apply basting stitch approximately 5 inches up from edge of

sleeve. This stitch will hold lining in place while the alteration is being formed.

2. Cut and remove stitches from sleeve lining at the hem.

3. Mark a two (2) inch hem from the desired length mark and cut off the excess material.

4. Fold on the desired length mark forming a new hem.

5. Apply a row of basting stitches in the center of hem (one (1) inch from folded edge of sleeve).

D. Tacking hem and replacing lining.

1. At each of the sleeve seams, apply a hand tacked stitch (approximately 3 or 4 stitches overlapping).

2. Cut off excess lining, and with basting stitch, place in position and baste lining to coat sleeve one (1) inch from edge of sleeve.

3. Apply the felling stitch to lining and sleeve hem. Stitches should be evenly spaced around the sleeve and should not be visible from face side of sleeve.

4. Press new hem and remove all basting stitches from the sleeve.

E. Operator's Maintenance and Maintaining DA Form 2404.

(If any portion of this period of instruction comes within the last hour of the working day, the student will be required to perform the necessary operator's preventive maintenance services in accordance with the check list for the 31-15 sewing machine. It is also necessary that the DA Form 2404 properly be maintained.)

SHORTENING SLEEVES OF OVERCOATS OR COATS WOOL

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate and explain the production steps followed in shortening sleeves of overcoats or coats, wool. Following the demonstration by the instructor the student will perform a practical exercise on the sleeve alteration. At this time the student is encouraged to ask questions or call on the instructor for assistance when in doubt.

II. Study References

AR 700-8400-1, "Issue and Sale of Personal Clothing", Page 41, par 48.

TM 700-8400-1, "Fitting of Uniform", Page 3, par 7; Page 15, par 12.

III. Tools, Supplies, and Equipment Required

Salvaged overcoats and/or coats, wool (ample supply)

Tailor's tool kit (1 set per student)

Hand sewing needles (1 per student)

Thread (ample supply)

Beeswax (ample supply)

IV. Direction to Students

During the demonstration, the student, will listen, observe, and ask questions. During the practical exercise is encouraged to call on the instructor for assistance when in doubt.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student performance, also to inspect the final results of the practical exercise for grading purposes.

VI. Job Breakdown

A. The performance standards which have been established for shortening sleeves and will be used by the instructor are listed below.

1. Remove all basting stitches from sleeve area.
2. Felling stitches evenly spaced and of the proper size.
3. Felling stitch not visible from face side of sleeve.
4. Hem should be of the proper width (2 inches).
5. Lining of the proper length. (If too short will cause a pull in the sleeve). If too long will cause a bulky appearance and may protrude from bottom of sleeve opening.
6. New hem pressed with hand iron.

B. The production steps to be followed during the practical exercise are listed to the left of the page. The key points to be remembered and applied are listed to the right of the page:

Shortening Sleeves of Overcoats or Coats, Wool	
1. Measure the amount to be shortened.	1. a. Measure from the bottom edge of the sleeve.
	b. Make sure of your measurements. (For demonstration purposes, the instructor will shorten 1 inch).
2. Mark sleeve, the amount to be shortened.	2. a. Place a mark 1 inch up from the edge of the sleeve.
	b. Mark completely around the sleeve 1 inch from the sleeve edge.
	c. Mark straight and even.
	d. Mark both sleeves.

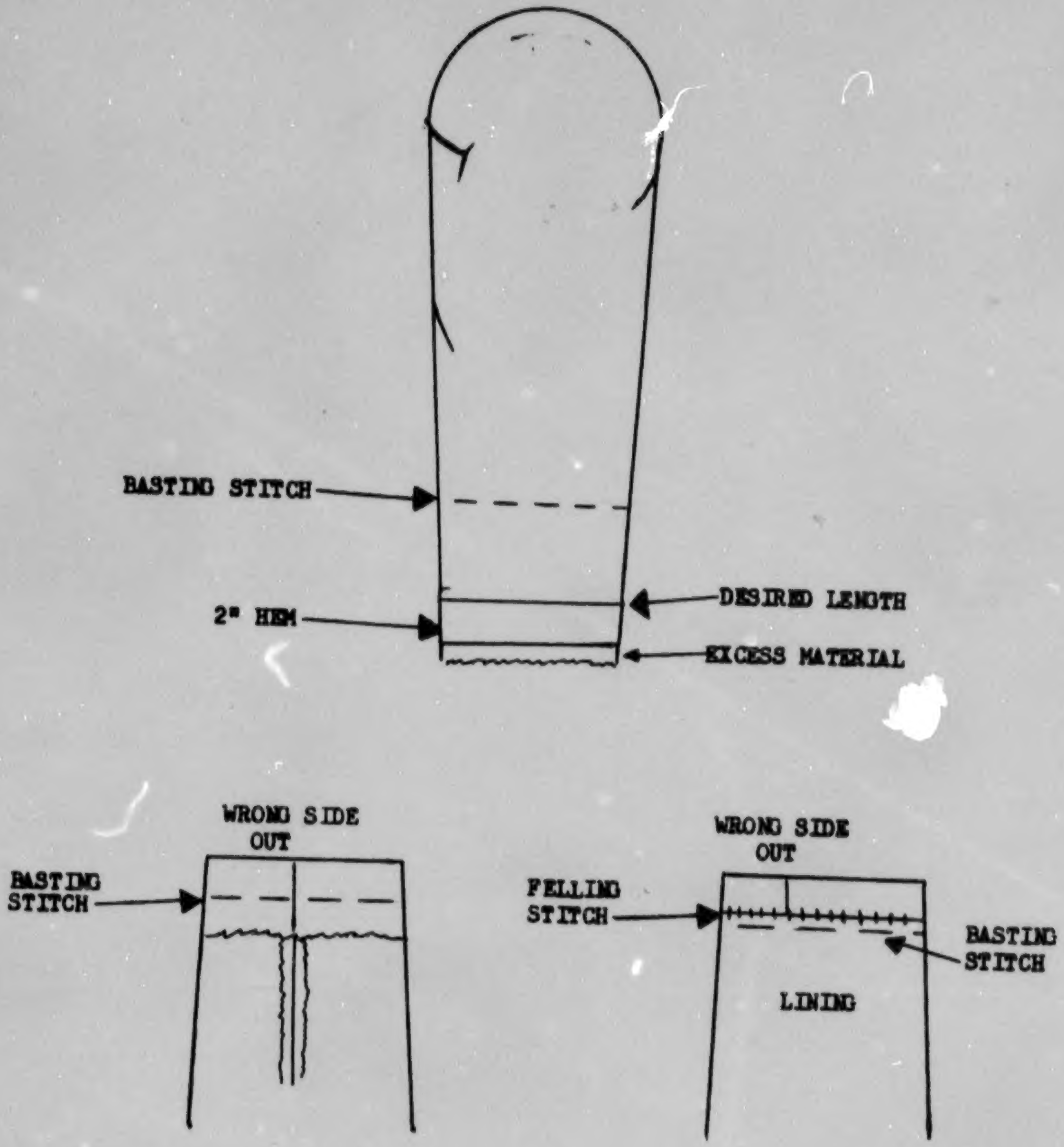
3. Baste sleeve.	3. a. Place a row of basting stitches approximately 5 inches from the sleeve edge. b. Basting stitches should catch both the sleeve and lining, to keep lining from shifting. c. Make basting stitches lay flat on the sleeve. d. Do not pull stitches hard, as sleeve will be stitched crooked. e. Baste stitch both sleeves.
4. Rip stitches holding lining.	4. a. Rip stitches holding lining to sleeve hem. b. Use ripper. c. Do not cut into lining or sleeve material. d. Remove old stitches.
5. Rip stitches holding hem to sleeve.	5. a. Some coats have stiffeners, if they do, rip stitches holding sleeve to stiffener. b. Other coats do not have stiffeners, and the hem is attached to the front and back seams of the sleeve.
6. Iron out old crease.	6. a. Lay sleeve flat and iron out old crease. b. Be careful not to iron out the desired length mark.
7. Cut off excess material.	7. a. Place a mark all around the sleeve, 2 inches from the desired length mark toward the sleeve end. b. This would be your cutting line, so make it straight and even. c. Cut off the excess material and cut on the cutting line even and straight.

	d. Make certain that the lining is tucked into the sleeve, out of the way, as we do not want to cut the lining at this time.
8. Mark stitching line for attaching lining.	8. a. Measure 1 inch down from the shortening mark. b. Mark all around the sleeve, even and straight.
9. Baste stiffener in place.	9. a. Turn sleeve inside out. b. Start your basting stitches 2½ inches in from the end of the sleeve. c. Make sure stiffener is even and straight and lays flat. d. Make sure stitches go through the sleeve and stiffener. e. Baste all around the sleeve and stiffener. f. If coat does not have stiffener, delete steps 9, 9a, b, c, d, and c, and go to step 10.
10. Fold hem on sleeve.	10. a. Fold sleeve to make hem. b. Fold edge of sleeve on top of stiffener. c. Fold up to the desired length chalk mark, 2 inches from sleeve edge. d. Fold even and straight.
11. Baste hem and tack hem.	11. a. Place a row of basting stitches ½ inch from the fold line (shortening mark). b. Place stitches through hem and through sleeve. c. Place stitches all around sleeve hem.

	d. Tack inside hem edge to the front and back sleeve seam. e. Make 4 tacks, one to each side of seam. f. Make sure hem lays flat.
12. Cut off excess lining.	12. a. Cut off excess lining, by cutting on old crease. b. Cut even and straight.
13. Baste lining to sleeve.	13. a. Pull lining out over the hem. b. Make sure lining is even, straight, not twisted and lays flat. c. Fold lining under until edge of lining meets the mark 1 inch from the sleeve end. (The mark placed on the hem for attaching the lining.) d. Baste and fold at the same time. e. Baste stitch $\frac{1}{2}$ inch from the fold line of the lining. f. Stitches should go through the lining, through the fold of the lining, and through the sleeve material. g. Baste all around the lining.
14. Fell the sleeve lining.	14. a. Fell the lining to the sleeve hem with felling stitches. b. Make felling stitches small, just catching the edge of the lining and the hem turn-under. c. Stitches should be no less than 1/16 inch apart and no more than 1/8 inch apart. Tack at the beginning. d. Make three to four tacks when you get back to the starting point.

15.	Remove all basting stitches and press sleeve.	15. a.	Remove all basting stitches with ripper.
		b.	Make sure you do not cut the material.
		c.	Remove basting stitches from lining, hem and the ones that show from outside of the sleeve.
		d.	With a damp cloth, press out sleeve. Make sure crease is straight at front and back of sleeve, that all chalk marks are removed and hem is pressed flat.
		NOTE:	Both left and right sleeves are prepared and stitched in the same manner.

Figure 25


BASTING STITCH
DESIRED LENGTH
2" HEM
EXCESS MATERIAL
WRONG SIDE OUT
BASTING STITCH
WRONG SIDE OUT
FELLING STITCH
BASTING STITCH
LINING

SHORTENING SLEEVE OF OVERCOAT AND COATS, WOOL

SECTION LIII

CONSTRUCTING CUFFS ON FIELD JACKETS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the construction of cuffs on field jackets. This instruction will include measuring, marking, pinning in place, removing old cuff, cutting excess material, constructing a new cuff, and replacing the new cuff to the jacket.

2. The field jacket being a field type garment, will have a tendency to wear at the cuff edges, more so, when the sleeve is not of the proper length. You will find this to be the normal cause, especially when working with machinery or field equipment.

3. Normally cuffs on the jacket will be replaced only when the remainder of the jacket retains the required wear expectancy as set forth in the current classification standards. When the cuffs are replaced, the replacement material must be of a matching shade of the original jacket.

B. As a result of this instruction, the student, given used field jackets, appropriate references, and hand sewing needle, will baste lining to sleeve; given ripper, will rip stitches to remove cuff; given scissors, tailor's chalk, appropriate references, and matching material, will mark and cut out a new cuff, using old one as a pattern; given 31-15 sewing machine and performance standards, will stitch around new cuff edge, resew cuff to jacket sleeve, and remove basting stitches to the satisfaction of minimal deviation standards established by the school; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Ripping off the old cuff

1. When using the ripper to remove the old cuff, be careful not to damage the jacket or the gas flap.

2. The neater you rip the stitches, the better condition the cuff will be to use as a pattern for making the new cuff.

3. Be careful when cutting the bartack at the end of the cuff and gas flap. You have to cut a little at a time, otherwise you will cut through the cuff and the sewing edge of the jacket.

B. Making the new cuff

1. When selecting material to make the new cuff, always select material to match as closely as possible to the color of the jacket. The best material is from a salvaged jacket.

2. Use the old cuff as a pattern to get the proper size and the correct amount of material for turn under.

3. When cutting with the scissors, cut even and straight, this will make it easier for you to sew the material.

C. Sewing the new cuff

1. In sewing the edge of the cuff, we will be using Seam Type #6.

2. In stitching the cuff to the jacket, we will be using seam Type #5. (First, we simple seam and then finish by top stitching).

3. Make your stitching even and straight and don't forget your tacking.

D. Operator maintenance and maintaining DA Form 2404.

1. Again, as in previous hours, the instructor will emphasize the

importance of you performing the operator's maintenance on the machine. If you don't keep the machine properly maintained, it will not perform the way it should.

2. In performing your maintenance, use the Operator Check List and make all necessary recordings on the DA Form 2404

CONSTRUCTING CUFFS ON FIELD JACKETS

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the construction and replacement of cuffs on field jackets, following the proper production steps and explaining the key points to be remembered. Following the demonstration the students will perform a practical exercise of the construction and replacement of cuffs. The student will be encouraged to call on the instructor for assistance when in doubt during the practical exercise.

II. Study Reference

AR 700-8400-1 "Issue and Sale of Personal Clothing", Page 41, par 48, Sec VIII.

III. Tools, Supplies, and Equipment Required

Salvaged Field Jackets - (ample supply)

Tailor's tool kit (1 set per student)

31-15 sewing machine (1 per student)

Replacement material (ample supply)

Thread (2 cones per machine)

IV. Direction to Students

During the demonstration the student will listen, observe, and ask questions. During the practical exercise the student is encouraged to call upon the instructor for assistance when needed.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student performance and also to inspect the final results of the practical exercise for grading purposes.

VI. Job Breakdown

A. The performance standards established which will be used by the instructor during the practical exercise are as follows:

1. The new cuffs of the same size and shape as the original cuffs.

2. Face side of material shown, when cuffs are complete.

3. Top stitch of cuff evenly spaced around the cuff ¼" from edges.

4. All tack stitches applied in accordance with the minimal deviation standards.

5. Cuff attached to sleeve with proper seam type (seam type #5).

6. Gas flap attached to cuff in the proper and original position.

7. All stitches properly formed (lock of stitch in center of material, no skipped stitches, length of stitch 12 to 14 stitches per inch).

B. The performance steps to be followed during this practical exercise are listed to the left of the page. The key points to be applied and followed are listed to the right of the page.

A. Removing old cuffs from field jacket.

1. Remove buttons from sleeve.	1. a. Buttons are located inside of sleeve openings, above cuffs.
	b. There are four (4) buttons, two (2) on each sleeve.
	c. Remove buttons with ripper.
	d. Be careful - Do not cut the lining or the sleeves.
	e. The removal of these buttons, allow you to baste the lining close to the sleeve edge.

2. Baste sleeve and lining.	2. a. Basting is made to keep the lining from slipping out of place. b. Start approximately $\frac{1}{2}$ inch above cuff. c. Baste from top side. d. Baste all around sleeves with one row of stitches. e. Make sure needle catches the lining.
3. Remove bar tacks.	3. a. Located on the cuffs, near the button holes. b. Remove by cutting with ripper. c. Cut the threads a little at a time, to prevent cutting the materials. d. Cut from top side. e. Remove loose stitches. f. Be careful - do not cut gas flap.
4. Rip stitches holding cuff to sleeve.	4. a. Start on either sleeve. b. Rip stitches from top side of cuff first. c. Start from square end of cuff. d. Rip stitches all around cuff. e. Rip gas flap stitches. f. Be careful - Do not cut sleeve or the gas flap. g. Rip stitches from bottom side of cuff. h. Remove cuffs from both sleeves. i. Keep cuffs, as they will be used as patterns to cut out new cuffs.

B. Making New Replacement Cuffs.

1. Take measurements from old cuff.	1. a. Measure length and width of old cuffs. b. Mark the measurements taken, on the old cuff. c. Add an extra two (2) inches on the length, for seams and turn under. d. Double the width measurement, plus an extra two (2) inches to work with. (For example: if length of old cuff is 12 inches, mark down 14 inches. If width is 2½ inches, double would be 5 inches and plus 2 inches would be a total of 7 inches. Therefore your measurements would be 14 inches length; and 7 inches width).
2. Cut material for new cuff.	2. a. Using your measurements 14 inches by 7 inches, cut two (2) pieces of new material. b. Make sure material is cut square and straight.
3. Fold new material.	3. a. Fold material in half, lengthwise. b. Fold material face to face. c. Fold both pieces of material. d. Mark the words "Face" on the face sides of the materials. e. Make sure the material is folded straight and square edged. f. Crease the material at the folded edge by rubbing the material with the rule. g. Creasing will keep the material even for stitching. h. You may also pin the material through both layers, to help keep it even and straight.

4. Mark outline of cuff on new material.	4. a.	Lay both pieces of material flat on the table, the open edge toward you.
	b.	Use old cuffs to make outline.
	c.	Place old cuff on new material, with the cuff point towards your right and the edge with the $\frac{1}{4}$ inch top stitch even with the folded edge of the new material.
	d.	Outline cuff from pointed end, across the open edge and the slanted end of the cuff.
	e.	Prepare both pieces of new material in the same manner.
	f.	Remove old cuffs and save, because they will be used for marking button and buttonhole placement on the new cuff.
5. Mark a cutting line on the new material.	5. a.	Measure and mark, no more or no less than $\frac{1}{2}$" from the cuff outline.
	b.	Mark the two (2) ends and the open edge only.
	c.	Mark both pieces of new material alike.
6. Cut away excess material.	6. a.	Cut on the 1/2 inch cutting line.
	b.	Cut even and straight.
	c.	Cut through both layers of material.
	d.	Make sure material does not slip, otherwise material will not be even on top and bottom layers.
	e.	Cut excess from both pieces of new material.
7. Prepare material for stitching the point.	7. a.	Lay both pieces of new material down with the points pointing to the right and the open edge toward you.

	b. Place a ¼ inch high chalk mark across the outline mark, at a point 1 3/4 inches in from the point edge and at the open edge. c. Mark both pieces of material alike.
8. Stitch point of the new material.	8. a. Start at the top of the point (folded edge). b. Sew on the outline mark. c. Tack no more than 1" and no less than 7/8" long. d. Sew from the top of the point, down to the bottom of the point and stop at the 1/4" mark. e. Tack no more than 1" and no less than 7/8" long. f. Sew straight and on the outline mark. g. Make sure the top and bottom of the material do not shift. h. Sew both pieces of material alike.
9. Prepare materials for turning the face side out.	9. a. Cut off the extreme point of the material by cutting in a straight line from top to bottom, across the width. Cut approximately 1/8 inch from the stitches. This is done to eliminate bulky and excess material when turning inside out. b. With the scissors, notch the bottom point, by cutting from the point, up to 1/8 inch from the stitches at the corner of the point. Notch both layers of the material.

	c. Again with the scissors, cut a notch from the open edge at the end of the bottom tack, up to 1/8" from the stitches.
	d. Prepare both pieces of material alike.
10. Turn the materials inside out.	10. a. Turn materials inside out at the point, so the "face" side will be out.
	b. Place the point of the scissors inside the material and push gently at each point of the cuffs until the points are rolled out flush and even with the stitch line.
	c. Do not push the scissors hard, as the scissors will make a hole in the material and you will have to prepare the material all over.
	d. Turn both pieces inside out.
11. Mark folding lines.	11. a. Mark folding lines on the open edge and slanted end of material.
	b. Mark lines on both sides and on both materials.
	c. Mark lines 1/2 inch from the edge.
12. Place materials in position for marking 1/4 inch top stitch line.	12. a. Place materials down, one piece with the point facing to the left and the open edge toward you and the other piece with the point facing to the right and the open edge toward you.
	b. Mark the one with the point to the left with an "L" for the left cuff and the other with an "R" for the right cuff.
	c. The materials are faced in this position so the neater top stitches will be to the outside of the cuff.

13. Mark materials for Top Stitching.	13. a. Start 1½ inches from the slanted end at the top (folded edge).
	b. Mark stitching line 1/4 inch down from the folded edge completely across the top, around the point and stop at notch mark.
	c. Mark only the sides with the "L" and "R" marked on them.
	d. Make lines straight and make sure they are 1/4 inch from the edge.
	e. Mark both pieces alike.
14. Top stitch each piece of material.	14. a. Sew on the 1/4 inch top stitch mark.
	b. Do not tack, as this will be done when attaching the cuff to the jacket.
	c. Remember to sew with the material markings "L" and "R" facing up.
	d. Make sure the corners of the point are secured properly.
	e. Sew exactly on the 1/4 inch top stitch mark and sew straight.
	f. After the two new cuffs are top stitched, they are ready to be attached to the jacket.
C. Positioning left cuff and left jacket sleeve.	
1. Lay left sleeve out flat.	1. a. Lay sleeve with opening toward operator's left.
	b. Lay sleeve in front of presser foot.
	c. Lay body of jacket under machine arm.
	d. Lay sleeve down, with the gas flap on the under side, or facing down.

2. Tuck gas flap into sleeve opening.	2. a. Tuck gas flap into sleeve opening by folding back. b. Make sure the tip of gas flap is laying flat on the sleeve edge.
3. Place left cuff on jacket sleeve.	3. a. Place cuff with point facing away from operator and open edge of cuff to operator's left. b. Place cuff into sleeve opening, with folded edge of cuff into sleeve. c. Make sure the side of cuff marked "L" is facing up. d. Open the top layer (layer marked "L") of cuff into sleeve. e. Slide the edge of the bottom layer of the cuff, even with the edge of the jacket sleeve and lining. f. Slide cuff on sleeve until the notch on the cuff is even with the edge of the sleeve where the gas flap is attached. g. Make sure the tip of the gas flap is under the cuff, and lining lays flat.
4. Place cuff and sleeve under presser foot.	4. a. Hold the cuff and the sleeve together and slide them under the presser foot. b. Slide the cuff and sleeve under the presser foot, from left to right with the sleeve opening facing left and gas flap facing down. c. Slide sleeve and cuff under presser foot, so you can begin sewing where the notch of the cuff and the end of the sleeve meets.

D. Stitching inside of left cuff to left jacket sleeve.

1. Tack at the starting point	1. a. The Simple Seam will be used, which is the first step in making Seam Type #5. b. Place needle into material no less than 5/16 inch from the sleeve and cuff edge and no more than 3/8 inch from the edge. c. Tack at starting point (where notch on cuff and sleeve end meet). d. Tack no less than **7/8** inch and no more than 1 inch long. e. Make sure you are stitching the inside bottom edge of the cuff.
2. Stitch the complete length of the inside of the cuff.	2. a. When sewing, rotate the sleeve and cuff together, a little at a time. b. Sew straight and stop every inch and check to see if the cuff will come out even with the sleeve end. c. Do not pull on materials, or cuff will come out shorter than sleeve end. d. Stop sewing approximately 3/4 inch from the end of the cuff and sleeve. e. Unfold gas flap and lay the flap flat towards operator's left. f. Fold the slanted end of the cuff on the ½" fold mark. g. Fold the end, upward and in, away from you.

h. Now continue sewing up to the end, of the cuff and tack, no less than 7/8 inches and no more than 1 inch long.

i. Remove jacket from under presser foot and machine.

E. Preparing jacket for stitching top side of cuff.

1. Turn jacket around.

1. a. Turn jacket so sleeve opening is facing operator's right and body of jacket is to operator's left on the work table of the machine.

   b. Pull cuff from inside of sleeve.

   c. Envelope the open end of the cuff over the jacket sleeve edge.

   d. Have cuff so "L" mark is now facing up.

2. Place sleeve under presser foot.

2. a. Slide sleeve under presser foot, at the point of the cuff.

   b. Make sure gas flap and bottom of sleeve are out of the way.

   c. Place needle into the ¼ inch stitch row on the point of the cuff 3/4 inches from the notch of the cuff.

   d. Fold cuff edge under, on the ½ inch fold line.

F. Stitching top side of left cuff to left jacket sleeve.

1. Tack cuff to sleeve.

1. a. Sew from the point and on to the sleeve, approximately ½".

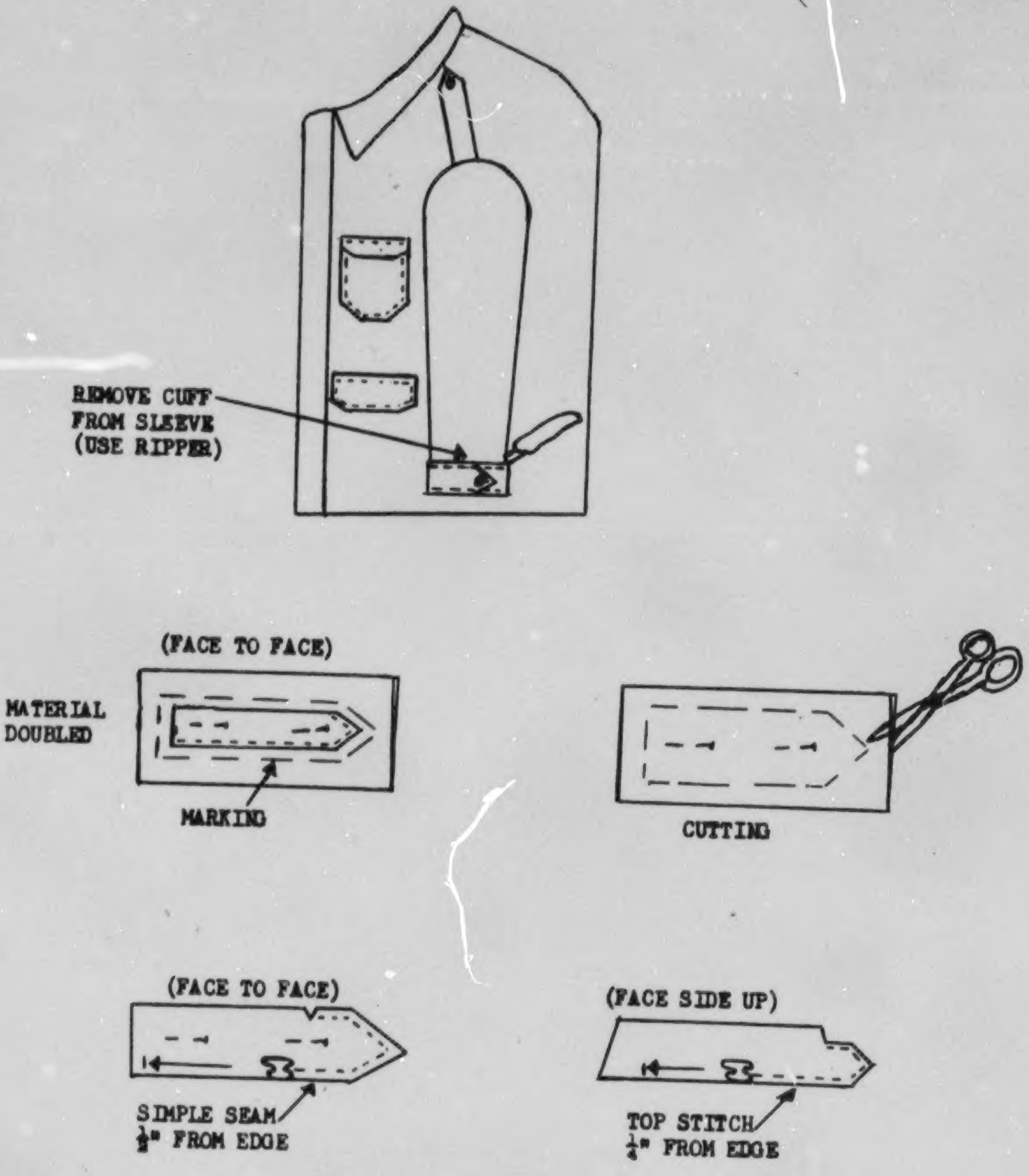
   b. Tack, at least twice, ½" long.

2. Stitch top edge of cuff to sleeve.	2. a. Place needle 1/16" from cuff edge. b. Make sure cuff edge covers old stitch line on sleeve. c. Tack starting point, no more than 1 inch long and no less than 7/8 inch long. d. When sewing the cuff, make sure you do not pull cuff too much, as cuff will not lay flat. e. Make sure stitch line is even, straight, and no closer than 1/16 inch to the cuff edge, or no further than 1/8 inch from the cuff edge. f. Sew all around the cuff edge, to within 1 inch of the end of the cuff. g. At this point, leave the needle into the material.
G. Stitching back end of gas flap into cuff opening.	
1. Place gas flap end into cuff opening.	1. a. Fold end of cuff under 1/2 inch. b. Fold on the 1/2 inch fold line. c. Tuck gas flap into opening at the slanted end of the cuff. d. Tuck gas flap into opening, up to the old stitch line on the gas flap.
2. Stitch remaining portion of cuff.	2. a. Continue sewing up to the corner of the cuff. b. Pivot cuff at the corner to the outside edge of the cuff faces operator. c. Make sure corner is secured properly.

3. Stitch gas flap into cuff opening.	3. a. Make sure gas flap remains into the cuff opening up to the old stitch line on the flap.
	b. Sew the top and bottom of the cuff at the same time.
	c. Make sure top and bottom edges of cuff stay even so needle will catch both pieces of material.
	d. Continue stitching 1/16 inch from cuff edge.
	e. Sew up to 1/4 inch from the outside edge of the cuff.
4. Tack stitch line.	4. a. Pivot cuff 1/4 inch from the edge.
	b. Sew onto the 1/4 inch row of top stitches on the cuff edge and tack no more than 1 inch and no less than 7/8 inches long.
H. Stitching front end of gas flap onto cuff.	
1. Spread cuff and gas flap flat.	1. a. Spread cuff flat with the point of the cuff facing left and flat on the work table of machine.
	b. Body of jacket should be to the left of the presser foot, on the work table of machine.
2. Place cuff and gas flap under presser foot.	2. a. Slide cuff under presser foot from rear of machine.
	b. Keep point of cuff facing left.
	c. Presser foot should be inside of sleeve opening.
	d. Slide cuff toward operator until the needle is in line with the inside edge of the gas flap and cuff.

3. Stitch gas flap to cuff and tack.	3. a. Sew from inside edge to the outside edge of cuff. b. Sew 1/16 inch from edge of gas flap and tack at the beginning and ending of the stitch row no less than 7/8 inch and no more than 1 inch long. c. Remove jacket from machine.
I. Marking Button Holes and buttons on cuff and removing basting stitches.	
1. Lay old cuff on new cuff.	1. a. Lay old cuff on new cuff from the top side. b. Make sure cuffs are even and straight.
2. Mark new cuff for buttons and buttonhole.	2. With tailor's chalk mark exact location of buttons and buttonhole on the new cuff. NOTE: Because you have had practice on making buttonholes and sewing buttons, you will not have to remake buttonholes on the new cuffs, or resew buttons.
3. Remove all basting stitches.	3. a. There is one row of stitches. b. Cut tack end of basting stitches. c. Catch hold of the knot on the other end of thread and gently pull thread until entire thread is out of sleeve.
J. Stitch right sleeve cuff, restitch gas flap on right sleeve, mark for buttons and button hole, and remove basting stitches.	a. Use steps C, D, E, F, G, H, and I, to attach the right cuff to the right jacket sleeve, except when you simple seam, work with the open end of the sleeve pointing to the operator's right and when top stitching have the sleeve opening facing the operator's left. (This is just the opposite of the left sleeve operation). b. After sewing both cuffs make a final check for workmanship and make any necessary corrections.

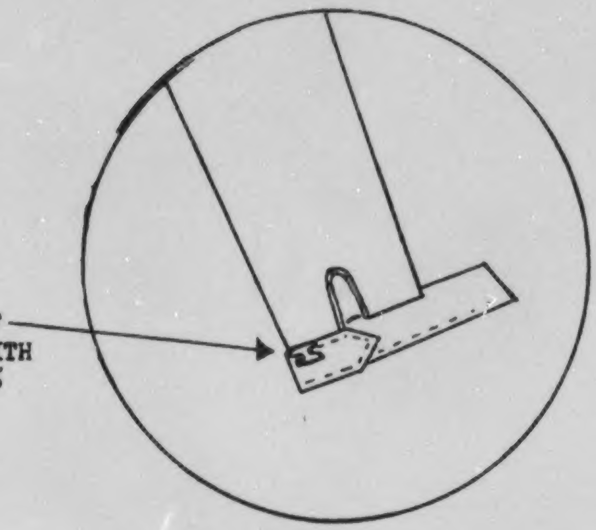
NOTE: ORIGINAL PAGE 53.18 HAS BEEN OMITTED; HOWEVER ALL MATERIAL IS INCLUDED.


REMOVE CUFF
FROM SLEEVE
(USE RIPPER)
(FACE TO FACE)
MATERIAL
DOUBLED
MARKING
CUTTING
(FACE TO FACE)
SIMPLE SEAM
½" FROM EDGE
(FACE SIDE UP)
TOP STITCH
¼" FROM EDGE

CONSTRUCTING CUFFS ON FIELD JACKETS

Figure 26

REPLACING CUFF ON FIELD JACKET- Continued


REPLACE CUFF
TO JACKET WITH
SEAM TYPE #5

SECTION LIV

SEWING INSIGNIA AND NAME TAPES

PRECIS

I Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss sewing of insignia and name tapes to the various authorized items of clothing. This instruction will include measuring, marking, pinning in place, and sewing insignia and tapes.

2. The army dictionary defines the "Insignia", as distinctive devices worn on the uniform to show grade, organization, rating, and service. The instructor will discuss each one of these in detail.

3. In addition to instructions received during this period, it will be necessary for you as clothing and textile repairmen to keep abreast with AR 670-5. "Uniform and Insignia." w/changes. This regulation governs the authorized wear of the various types of insignias, how they are worn, and on what type of garment the insignia will be worn.

B. Objective

As a result of this instruction, the student, given used shirts, jackets and coats, yardstick, tailor's chalk, and appropriate references, will measure and mark appropriate position of chevron and patch on appropriate garment sleeve; given straight pins, chevrons, and patches, will pin chevrons and patch to appropriate position marked on appropriate garment sleeve; given 31-15 sewing machine, supplies, and performance standards, will sew chevron and patch to garment sleeve to the satisfaction of standards prescribed by

AR 670-5, and remove all pins; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Insignia, distinguishing "U.S. Army".

1. Description - A woven label, 4¼ inches in length and 1 inch in width. On it is "U. S. Army," in golden yellow block letters 3/4 inch in height, on a black background and/or of an adopted specification, 4½ inches in length and 1 inch in width, consisting of "U. S. Army" in black block letters 3/4 inch in height on an OG background.

2. How worn - On the upper left breast of the following items of field clothing. Instructor will emphasize "field clothing" only.

a. Jacket, cotton sateen, OG-108 (fatigue jacket).

b. Coat, cotton, wind resistant, sateen, OG-107 (field jacket).

c. Shirt, wool, 16 oz, OG-108.

d. Parka, cotton-nylon, oxford, OG-107.

B. Insignia of grade for enlisted personnel.

1. Noncommissioned Officers and Private First Class.

a. Description - Embroidered chevrons, arcs, lozenges, and stars of gold color on an Army green, dark blue, or white background. It is 3 inches in width, having a 1/8 inch edging around the entire insignia and 3/16 inch space between each 5/16 inch chevron and arc.

b. How worn - On the outer half of both sleeves on coats, jackets, overcoats, and shirts when worn as the outer garment and on work clothing as shown in figure 48, page 79, AR 670-5.

(1) Insignia with Army Green background will be worn with the Army Green, Army Tan, Army Khaki, and work Uniforms.

(2) Insignia with blue or white background will be worn with the Army Blue or Army White uniform as appropriate.

2. Army specialists insignia

a. Description - Embroidered arcs, and chevrons 5/16 inch in height with an eagle device of gold color on an Army Green or dark blue cloth background. It is 3 inches in width, arched at the top and shaped like an inverted chevron at the bottom. There is a 3/16 inch space between each arc and chevron.

b. How worn - same as the noncommissioned officers and privates first class insignia.

C. Organization shoulder sleeve insignia.

1. Description - Description in this case would be hard to get across to you, because shoulder sleeve insignia are too numerous and are of too many different sizes, shapes and designs. It would take two (2) to three (3) hours just to show and identify each one to you, and you could not remember all of them. The important thing that you are concerned with, is how they are worn. The instructor will show you a few of the various organization sleeve insignia, however, to give you an idea of what they look like.

2. How worn - On the upper part of the outer half of the left sleeve of the service coat; overcoat, cotton, olive green, Army shade no. 107; jackets, field and fatigue; and the shirt when worn as an outer garment. When arc tabs are worn, the uppermost tab will be placed ½ inch below the

top of the shoulder seam. The organizational insignia will be lowered accordingly. Shoulder sleeve insignia will not be worn on the overcoat, wool, taupe, Army shade no. 79, nor on the short sleeve shirt.

D. Insignia of Service. (Service Stripes)

1. Description - Gold color rayon stripe 1-13/16 inches in length, 3/16 inch in width within an Army Green schragg - stitch border 3/32 around the stripe, on a cloth background of Army Green shade no. 159.

2. How worn - on the outside half of the left sleeve of the service coat, placed at an angle of 45 degrees, the lower end toward the inside seam of the sleeve. For each additional period of 3 years, another stripe will be worn above and parallel to the first stripe, with 1/16 inch background space between stripes.

E. Name Tapes.

1. Description - A white tape approximately 4¼ inches in length and 1 inch in width, or an OG in color tape with black, block letters.

2. How worn - On the upper right breast ¼ to 3/8 inch above the top edge of pocket, or comparable position on garments with no pocket, of items of field clothing on which the insignia, distinguishing "U. S. Army," is authorized.

F. There are many more insignia such as overseas service bars, overseas service chevrons, wound chevrons, and officer candidate insignia to mention a few. You may, at one time or another, have to sew any one of these, plus the ones we have discussed in detail. The ones we discussed in detail, are the more basic insignia to be sewn on garments, and are the ones we will be more concerned with.

1017

G. Operator's Maintenance and Maintaining DA Form 2404.

1. It is important that you perform operator's preventive maintenance service to your machine daily.

2. DA Form 2404 must be kept current and entries recorded by the operator.

SEWING CHEVRONS AND PATCHES

PRACTICAL EXERCISE

I. Introduction

During this practical exercise the instructor will demonstrate the proper procedures followed in measuring to the specified measurements, placement and pinning the insignia to the garment, and sewing the insignia to the item of clothing. Following the demonstration by the instructor the student will perform a practical exercise in accordance with the production steps listed in Paragraph VI.B.

II. Study Reference

AR 670-5, "Uniform and Insignia," Chapter 14.

III. Tools, Supplies and Equipment Required

Salvaged shirts, jackets, and coats (ample supply)
Tailor's tool kit (1 set per student)
31-15 sewing machine (1 per student)
Thread (2 cones per machine)
Insignia (ample supply)

IV. Direction to Students

During the instructor's demonstration the student will listen, observe and ask questions. During the student practical exercise the student will call on the instructor for assistance when in doubt.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student practical exercise and also to inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards which have been established and will be used by the instructor are listed as follows:

1. All insignia positioned properly to the item of clothing.

2. Organization insignia ½" from shoulder seam.

3. Insignia of grade one-half the distance between elbow and shoulder seam.

4. Service insignia placed and sewn 4" from bottom edge of sleeve and at a 45° angle on the left sleeve.

5. All insignia stitched no less than 3/32" to edge and no more than 1/8" from the edge.

6. All insignia stitched straight and even to conform with the shape of the sleeve.

7. No puckers visible in coat sleeve and lining.

8. All edges and/or corners of insignia should be secured.

9. All pins and chalk marks used should be removed from the garment.

10. All stitches properly formed, (no skipped stitches, lock of stitch in center of material, length of stitch 12 to 14 stitches per inch).

B. The performance steps to be followed during the practical exercise in sewing of insignia are listed to the left of the page. The key points to be remembered and applied are listed to the right of the page.

A. Attaching insignia, "U. S. Army," and name tapes.

1. Lay jacket on table.

1. a. The instructor will use a fatigue jacket for demonstration, but the same measurements are also used on field jackets and field shirts.

	b. Lay jacket flat on the table with the front sides facing up. c. Smooth jacket out to eliminate all wrinkles.
2. Measure and mark the left breast pocket.	2. a. Using the 12" rule and tailor's chalk, measure and place a mark no further than 3/8" and no closer than ¼" above the top edge of the pocket. b. Place a mark at each end of the pocket. c. With the ruler, connect the marks making a straight line.
3. Measure and mark the right breast pocket.	3. Use Key Points A2 a, b, and c.
4. Place the insignia on the jacket.	4. a. Place the insignia, back side down, over the left breast pocket. b. Place the bottom edge of the insignia on the chalk line. c. Center the insignia over the pocket.
5. Pin the insignia in place.	5. a. Place a straight pin, from the top, down through the insignia and jacket, and back up through the jacket and insignia. NOTE: When pinning the insignia to the field jacket, also catch the lining to eliminate puckering of the lining when sewing. b. Place a pin at each end of the insignia and centered. c. Place pins so that the head or point is at least 1" from the ends to allow for sewing.

6. Cut a piece of name tape.	6. a. Name tape comes in a roll, and is 1" wide and white. b. Cut a piece of tape 5¼" long.
7. Mark name tape.	7. a. Measure ½" from each end of tape and mark a straight line across the width. b. This is to be used as ½" turn under of raw edges when sewing.
8. Pin the name tape in place.	8. a. Pin the name tape over the right breast pocket. b. Use Key Points A5 a, b, and c. c. Make sure name tape is centered over the pocket and bottom edge of tape is on the chalk line.
9. Preparation for sewing insignia to jacket.	9. a. When sewing insignia to an individual's jacket, make sure you use black thread to blend in with the insignia. b. Open jacket, outside up, place under presser foot. c. Place jacket so that top edge of insignia is under presser foot, and bottom edge of jacket is to the operator's left. d. Make sure no other parts of the jacket is under the presser foot.
10. Sew insignia to jacket.	10. a. Turn balance wheel by hand and place needle into top edge of insignia. b. Place needle no closer than 1/16" to the edge and no further than 1/8" from the edge of insignia. NOTE: Any closer than 1/16" from the edge will cause you to run off the insignia, and any further than 1/8" from the edge will cause the edges to curl up and look sloppy.

	c. Stitch all around the four (4) sides of the insignia, making sure stitch line is straight, and not more than 1/8" from the edge or not any closer than 1/16" to the edge.
	d. Make sure the corners are secured properly, and the raw ends are turned under.
	e. When you get back to the starting point, tack over the stitch line approximately 1" to secure the row of stitches.
11. Preparation for sewing name tapes to jacket.	11. a. When sewing name tapes to an individuals jacket, make sure you use white or OG thread to blend in with the tape.
	b. Use steps A, 9, b, c, and d to prepare jacket for sewing name tapes, except that you place the name tape under presser foot.
12. Sew name tape to jacket.	12. Use steps A 10, a, b, c, d, and e to sew name tapes to jacket.
13. Remove all pins and markers.	13. a. Remove all pins.
	b. Iron out all chalk marks.
B: Attaching organizational shoulder sleeve insignia, insignia of grade, and insignia of service.	
1. Lay coat on table.	1. a. We will use a service coat, to enable us to sew all the basic insignia.
	b. Lay coat so outside of left sleeve is facing up.
	c. Flatten and smooth out left sleeve so the rear seam is on the extreme rear edge, and the front crease is on the extreme front edge.

2. Measure and mark center of sleeve.	2. a.	With tailor's chalk, place a mark on the sleeve ¼" to the rear of the center of the epaulet. This would be the center of the sleeve at the shoulder.
	b.	Approximately 8" down from the shoulder seam, measure across the sleeve and place a mark in the center of the sleeve.
	c.	Repeat step D 2, b every 3" down the sleeve until the complete sleeve is marked.
	d.	Now connect the center marks together by making a line from the shoulder seam to the end of the cuff edge.
3. Measure and mark sleeve for organization shoulder sleeve insignia.	3. a.	Measure ½" down from shoulder seam.
	b.	Draw a line across the sleeve at this point.
4. Mark center of organization insignia.	4. a.	Fold insignia in half from side to side to find center.
	b.	Place a mark at top and bottom of insignia with tailor's chalk.
5. Pin organization insignia on sleeve.	5. a.	Place the top of the insignia on the 1/2" mark by the shoulder seam.
	b.	Place the top and bottom center mark of the insignia on the center mark of the sleeve.
	c.	Place hand inside the sleeve, opening at the shoulder to guide the pins.
	d.	Place a pin at the top of the insignia.

	e. Place pin from the top, down through the insignia, coat and lining and back up through the lining, coat and insignia. f. Place pin approximately ½" from edge of the insignia to allow for sewing. g. Place another pin at the bottom of the insignia in the same manner. h. Make sure insignia is pinned straight and coat and lining are not puckered. i. Larger insignia can take more pins.
6. Mark a sewing guide line around organization insignia.	6. a. Place a mark, with tailor's chalk, on the sleeve completely around and touching the edge of the insignia. b. You may also place small marks at various points on the insignia and running onto the sleeve as guide lines, to keep the insignia from shifting when sewing.
7. Measure and mark sleeve for insignia of grade (Chevrons).	7. a. Find a point in the sleeve where the elbow would normally bend, and place a mark. b. This would be a point where the back of the sleeve starts to taper forward. NOTE: If an individual personally brings in clothing for Chevrons to be sewn on, have him try them on to get this measurement. c. Now measure the distance from the elbow mark, upward to the shoulder seam. d. Place a mark on the sleeve halfway between the elbow and

	shoulder seam. This mark is where the center of the Chevron will be placed.
8. Mark the center of the insignia of grade (Chevron).	8. a. Fold the insignia in half from top to bottom and place a mark on both sides.
	b. Fold the insignia again in half, this time from side to side, and place a mark at the top and bottom.
9. Pin insignia of grade on sleeve.	9. a. Place insignia on sleeve so center marks across insignia align with mark across sleeve at halfway point, and center top and bottom marks align with center marks on sleeve.
	b. Place hand inside of sleeve opening at shoulder to guide pins.
	c. The number of pins placed to hold the insignia, will depend upon the size of the insignia.
	d. An insignia with two (2) and three (3) chevrons would take three (3), one (1) in the center, and one (1) in each side. Use your judgment, but make sure you have enough to hold the insignia while sewing to keep it from shifting, and place pins so they don't interfer with the machine needle while sewing.
	e. Make sure lining is pinned, insignia is straight, and coat and lining is not puckered.
10. Mark a sewing guide line around insignia of grade.	10. Mark around and across insignia of grade, as we did the organization insignia.
11. Measure and mark sleeve for placement of insignia of service (service stripe).	11. a. Measure 4" from the bottom edge or cuff of the sleeve and place a mark across the sleeve.

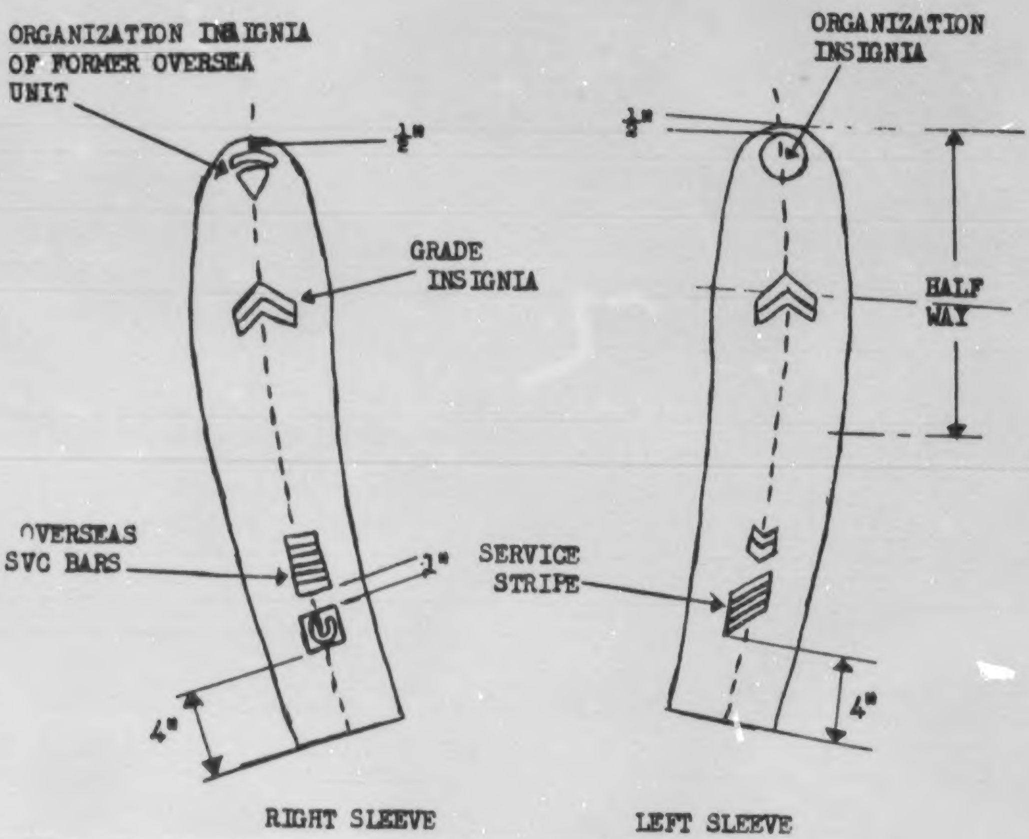
	b. This is the distance from the cuff edge that the service stripe will be sewn to the sleeve.
12. Mark the center of the service stripe.	12. a. Service stripes are made on a 45° angle. b. Fold stripes in half, across the 45° angle. c. Place a mark at the center, top and bottom.
13. Pin service stripe to sleeve.	13. a. Place stripe where lower end or point of the stripe rests on the 4" mark on the sleeve on a 45° angle, and top and bottom center marks align with center mark on sleeve. b. Place hand inside of sleeve through cuff opening to guide pins. c. Place a pin at the top and at the bottom of the stripe. Place pins through all layers of material. d. Make sure stripe is centered and straight, and coat and lining are not puckered.
14. Mark a sewing guide line around service stripe.	14. Mark around and across service stripe as we did the two (2) previous insignia.
15. Measure center of right sleeve.	15. a. Turn coat around so right sleeve now faces up. b. Prepare right sleeve for marking, and mark center line using steps D1 and 2.
16. Measure and mark right sleeve for placement of insignia of grade.	16. Use steps D 7.
17. Mark and pin insignia of grade on right sleeve.	17. Use steps D 8, 9, and 10.

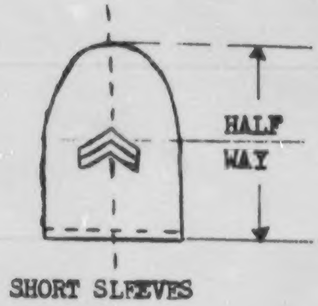
18. Prepare coat for sewing insignia.	18. a. Make a final check to see if all insignia are pinned straight and are in the right positions.
	b. Turn both sleeves inside out. We will sew with the inside of the sleeve facing the feed dogs, of the machine, and the needle inside the opening of the sleeve from the top side. (This is to prevent stitching any other parts of the coat.)
	c. The color of sewing thread used, depends upon the background of the insignia. Match thread as close as possible to the background color of the insignia.
19. Place coat under presser foot for sewing organization insignia.	19. a. Start with left sleeve first.
	b. Lift presser foot, and make sure needle bar is at its highest point.
	c. Place coat with the inside facing down and the collar away from you.
	d. Slide coat, starting from the button holes, under the presser foot.
	e. Place the sleeve opening directly under the needle bar.
	f. Smooth sleeve opening out until organization insignia is plainly seen.
20. Stitch organization insignia to coat.	20. a. Turn balance wheel of machine by hand and place needle into right side of insignia.
	b. Place needle no closer than 3/32" to edge and no more than 1/8" from edge.
	NOTE: Any closer than 3/32" to the edge will cause in-

	signia to unravel and come loose of the stitches. Any further than 1/8" from the edge will cause the insignia to curl up at the edges.
	c. Stitch all around the insignia and back to the starting point, then tack over the starting point no more than 1" and no less than 7/8" to secure the stitch row.
	d. Make sure the guide marks are used for sewing, (helps keep the insignia from shifting and being stitched on crooked) and corners secured.
	e. When sewing, stitch a little at a time, turning the coat a little at a time as we sew. This will keep the stitch line straight and even along the edge. It will also help to keep you from running off the edge.
21. Stitch insignia of grade to coat.	21. a. The coat is in the right position for stitching the insignia of grade.
	b. Work the sleeve to the rear of the machine until the insignia of grade becomes visible.
	c. Use steps D 20 a through e to stitch insignia of grade.
	d. After tacking stitch row, remove coat from machine.
22. Prepare coat for stitching insignia of service (service stripe).	22. a. With sleeve still turned inside out, turn sleeve so service stripe is facing toward inside sleeve.
	b. Place sleeve opening (at cuff end), under presser foot.

		c.	Pull coat under presser foot from the back toward you.
		d.	Work material toward the operator, until the service stripe is visible.
Stitch the insignia of service to coat sleeve.	23.	a.	Use steps D 30 a through e to stitched service stripe.
		b.	After tacking, remove coat from machine.
Stitch insignia of grade to right sleeve.	24.	a.	Place coat under machine as we did left sleeve, except slide coat under machine from left to right, from the button side of the coat.
		b.	Stitch insignia of grade on right sleeve using Steps D 20 a through e, and D 21 b through d.
		c.	After removing coat from machine, make a final check for workmanship and make any corrections needed, remove all pins, and iron out all chalk marks.

Figure 27


ORGANIZATION INSIGNIA OF FORMER OVERSEA UNIT
½"
GRADE INSIGNIA
OVERSEAS SVC BARS
1"
4"
RIGHT SLEEVE
ORGANIZATION INSIGNIA
½"
HALF WAY
SERVICE STRIPE
4"
LEFT SLEEVE


HALF WAY
SHORT SLEEVES

SEWING INSIGNIA AND NAME TAPES

SECTION LV

REPLACING ZIPPERS ON TROUSERS, WOOL

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss the proper procedures followed in replacing of zippers on trousers, wool. This instruction will include removing the damaged zipper, measuring and selection of a new zipper, and replacing the zipper to the trouser.

2. A zipper or commonly known as "slide fastener" in all supply catalogues, are utilized as a time saving device, designed for economical purposes and a replacement for the button. Properly applied to a garment, will result in a neater appearance to an item of clothing.

3. If properly maintained the life expectancy of a zipper can be an indefinite period, however constant abuse can easily damage or break a zipper. Improper use will also cause a zipper to function improperly. Whatever the cause may be, as clothing and textile repairmen it will be your duty to replace damaged zippers on all items of authorized clothing.

B. Objective

As a result of this instruction, the student, given used wool trousers with zippers, appropriate references, and a ripper, will rip seams holding zipper, and will remove zipper, given size chart of zipper and trouser combination, and zippers of various sizes, will select the appropriate size zipper in accordance with size of trousers; given 31-15 sewing machine and appropriate supplies, will sew selected zipper to trousers and stitch open seams in accordance with performance standards as outlined in TM 10-267;

given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

II. Presentation

A. Removing zipper from trousers, wool.

1. Start at the left side of fly and rip stitches. (Start at top, work down as far as the tacking stitch bottom of fly.)

2. Where the zipper is tucked under at the waist band, rip just enough stitches to remove the end of the zipper.

3. In cutting the stitches take necessary precautions not to damage the trouser material.

4. Cut stitches and remove the zipper from fly on right side of trouser.

5. Cut and remove stitches from the fly facing.

6. Cut stitches from bar tack at bottom of fly and remove the zipper.

7. Do not cut below or beyond the tacking stitches.

B. Prepare trousers and zipper for replacement.

1. Remove all old loose stitches from the trouser fly.

2. Select zipper of the proper size and length. Color and shade of zipper should be of a matching shade of trousers.

C. Replacing zipper to trouser.

1. Pin zipper to the fly facing and sew zipper to the facing.

2. Follow same procedure on left side of fly. Make certain zipper is aligned.

3. Sew facing to trousers, make certain to follow old stitch line.

4. Stitch waist band to trouser fly, securing the zipper.

5. Replace the tacking stitch at the bottom of the fly.

D. Operator's maintenance and maintaining DA Form 2404.

1. Keep moving parts of your sewing machine free of lint and dirt.

2. Lubricate all oil points as required, a well maintained sewing machine will perform to your satisfaction.

3. Maintain the DA Form 2404 daily.

REPLACING ZIPPERS ON TROUSERS, WOOL

PRACTICAL EXERCISE

I. Introduction

During this period the instructor will demonstrate the performance steps in removing a damaged zipper, selecting a zipper of the proper size and color, and replace by sewing a new zipper to the trousers. During this period the students should ask questions when in doubt. Following the demonstration by the instructor the student will perform a practical exercise in replacing zippers on trousers.

II. Study Reference

TM 10-267 "General Repair for Clothing and Textiles", page 22, par 12.

III. Tools, Supplies, and Equipment Required

Salvaged wool trousers - (ample supply)

Replacement zippers - (ample supply)

Tailor's tool kit - (1 set per student)

31-15 Sewing machine - (1 per student)

Thread - (2 cones per machine)

IV. Direction to Students

During the demonstration the student will listen, observe, and ask questions when in doubt. During the practical exercise the student will call on the instructor for assistance when needed.

V. Performance Standards

The performance standards are established to be used by the instructor in checking student performance, also to be used in inspecting the final results of the practical exercise for grading purposes.

VI. Job Breakdown

A. The performance standards which will be used and followed by the instructor are listed below.

1. Zipper replaced in accordance with the instructor's demonstration.

2. Zipper of the proper size and length, also as the shade or color of the original zipper.

3. Stitch lines straight and in proper position with fly facing.

4. Bar tack at base of fly applied.

5. Zipper slide moves freely.

6. Stitches formed properly (lock of stitch in center of material, no skipped stitches, and length of stitch 12 to 14 stitches per inch).

7. Top of zipper tucked under the waistband properly

B. The production steps to be followed during the practical exercise are listed to the left of the page. The key points to be remembered when replacing the zipper are listed to the right of the page.

Replacing zipper on trousers, wool.

1. Remove zipper from trousers.

1. a. Cut stitching of seam that joins zipper with trousers at the fly.

   b. Start at waistband and work down towards the bottom of fly, to the tack stitch.

   c. At the top portion where the zipper is tucked under the waistband, cut just enough stitches to pass zipper through.

   d. Repeat above procedures to remove zipper from opposite side of trouser fly.

e. Cut and remove tack stitches from bottom of fly. Do not cut any seams or stitches below or beyond the tack stitch.

f. Cut and remove stitches holding fly facing to trousers.

g. Clean and remove all old loose stitches from fly area.

2. Replacing zipper to trousers, wool.

2. a. Select zipper of the proper size and length.

b. Pin zipper to trouser fly facing. Use old stitch line as a guide.

c. Make certain the zipper stop does not go beyond the fly facing.

d. Stitch zipper to fly facing using two (2) stitch seams ¼" apart.

e. Start the stitching just below the waistband and sew down towards bottom of fly.

f. Pin the remaining half of the zipper to the left side of the trouser fly. Place the zipper on the left edge of fly lining, then place the folded edge of trousers onto the zipper and pin in place.

g. Stitch down the folded edge of the trousers 1/16" from the fold. Make certain to use the zipper foot attachment to the sewing machine.

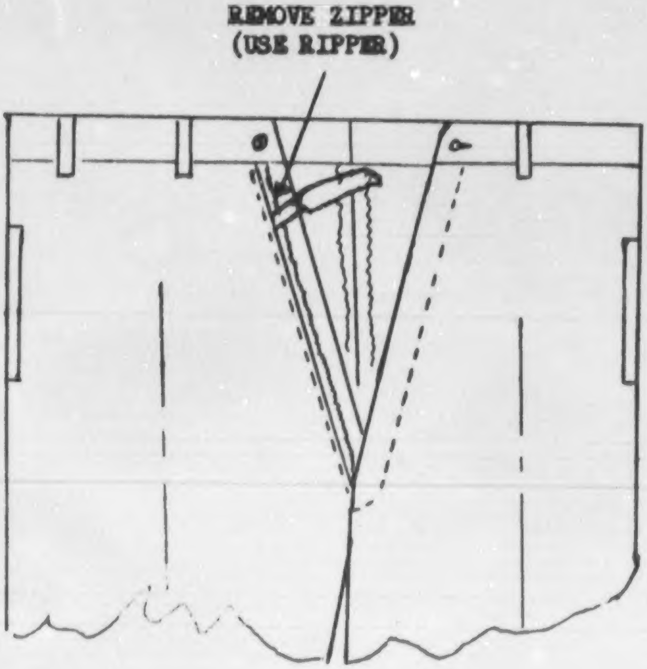
h. Stitch waistband to trousers, make certain the zipper is tucked under the waistband.

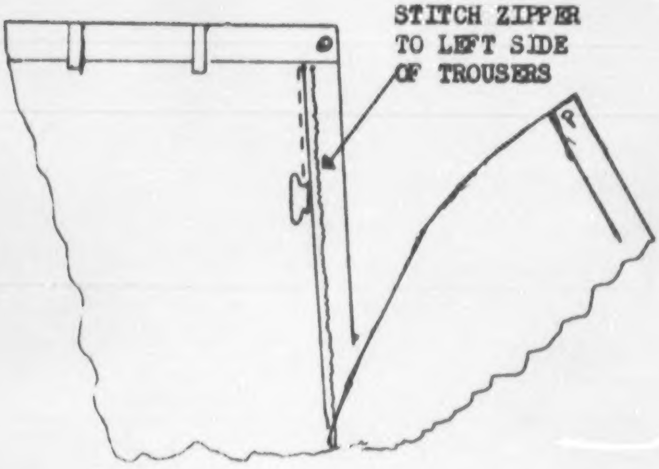
i. Pin in place the fly facing to the trousers. Make certain it is not pulled into a bias.

j. Stitch from top side of trousers and stitch the trousers to the fly facing. Use old stitch line as a guide.

k. Bar tack by sewing the bottom of the trouser fly.

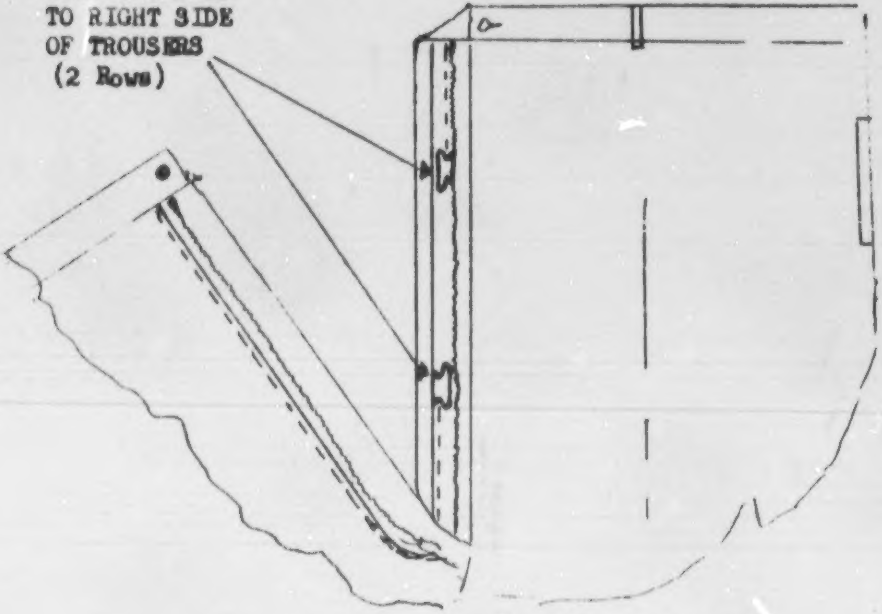
Figure 28


REMOVE ZIPPER
(USE RIPPER)

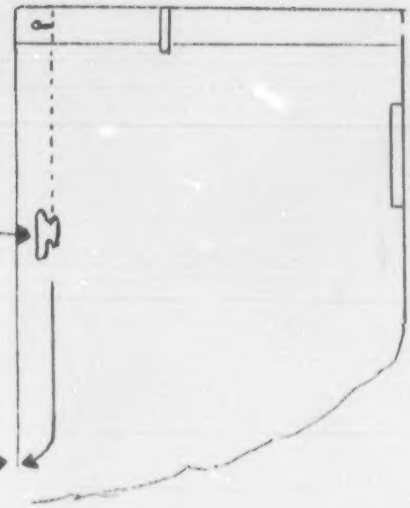

STITCH ZIPPER
TO LEFT SIDE
OF TROUSERS

REPLACING ZIPPERS ON TROUSERS, WOOL

REPLACING ZIPPER ON TROUSERS, WOOL(Continued)



STITCH ZIPPER
TO RIGHT SIDE
OF TROUSERS
(2 Rows)



STITCH TROUSERS
TO FLY LINNING
(TOP SIDE)
FOLLOW OLD STITCH
LINE

TACK STITCH

SECTION LVI

REPAIRING WET WEATHER WEAR

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period the instructor will discuss repairing of wet weather wear. This instruction will include repairs to damaged collars, pockets, buttonholes, replacing buttons, and patching damaged areas of wet weather wear items.

2. The raincoat and poncho are worn primarily to protect the individual's body from inclement wet weather, therefore, it is important that it be properly maintained and kept in a serviceable condition at all times.

3. There are two (2) types of raincoats authorized for wear: Raincoat, Synthetic, Rubber coated, Shade OG 207; and Raincoat, Man's, Coated Nylon, Shade No. 179. We will be primarily interested in raincoat synthetic, rubber coated and the poncho during this period. You will find that these two items are worn in the field are subject to become damaged more often than the nylon coated raincoat.

B. Objective

As a result of this instruction, the student, given appropriate references, will name the four types of repairs authorized on wet weather wear in accordance with appropriate; given a 31-15 sewing machine, appropriate supplies, repair materials, and used wet weather wear with damages fixed by the instructor (damaged buttonhole, damaged hem, pulled out button, damaged pocket), will make appropriate repairs by machine; given patching cement, spatula, and scissors, will cut patches to correct size to overlap appropriate damage, cement patch over damage, remake new buttonhole, and attach new button in accordance with performance standards prescribed in appropriate references; given DA Form 2404 and appropriate check list, will perform operator's maintenance as necessary and maintain DA Form 2404.

C. Repair Methods

1. Patching

a. Cut patches from matching material allowing a minimum overlap of ½" beyond edges of damaged area.

b. Apply thin coat of adhesive to underside of patch, and area of garment to be patched. Allow the adhesive to dry to a tacky condition.

c. Roll down the patch over the damaged area with a roller, with additional effort put on the edges of the patch.

d. Allow the excess adhesive around the patch to dry, and then remove the excess with a stiff hand brush.

e. In applying a patch to a raincoat or poncho, the corners of the patch should be rounded.

2. Buttons

a. Replace missing buttons by machine or by hand sewing.

b. Where buttons are torn out, cement a patch over and under the damaged area and then apply a new button.

c. Buttons should be of a matching shade and size.

3. Buttonholes

a. Damaged buttonholes will be reinforced by darning a piece of material under the damaged area of the buttonhole.

b. Apply a cement patch or adhesive tape over the buttonhole and damaged area, continue to the edge of the garment, to the underside of the buttonhole.

c. Cut out a new buttonhole of the correct size, and sew a new buttonhole.

4. Collars

a. Replace the entire collar if it is damaged.

b. Select material matching the original collar.

c. Remove the old collar, using it for a pattern, and cut out a new collar from the replacement material.

d. Fabricate a new collar, and replace it to the raincoat. If sewn together and applied by sewing, a seam sealant must be used.

e. If the collar is badly soiled or just worn at the neckline, a new collar will not be required. All that will be required is a strip of replacement material cemented to the soiled or worn area.

5. Pockets

a. Pocket openings when damaged will be darned or sewn by machine, and a cement patch applied over the damaged area for reinforcement.

b. In the event of a badly damaged pocket, fabricate a new patch pocket from replacement material and adhesive tape for reinforcement, and replace same as the original pocket construction.

6. Shoulder loops or epaulets.

a. Restitch or replace loose, missing or defective shoulder loops.

b. Use old loop for pattern to fabricate a new loop.

7. Belt loops, belt keepers, hangers and sleeve tabs.

a. Restitch or replace loose, missing or defective belt loops, keepers, hangers and sleeve tabs.

b. Replacement material will be of matching shade and material.

8. Sleeves

a. Damaged or worn sleeve edges will be repaired with a strip of material cut at a bias and cemented to the edge.

b. Frayed edges of the sleeve will be repaired by cutting off the frayed edges, turning under a new hem and stitching by machine.

9. Hems

a. Cut off worn or frayed hems.

b. Turn under new hem and stitch by machine.

10. Drawcords and Lace (Poncho)

a. Replace missing, frayed or defective drawcords with a new one.

b. Drawcords should be of the same diameter and length as the original.

11. Hardware

a. Straighten bent and damaged hardware that is otherwise serviceable.

b. Replace hardware such as keeper, rivets, eyelets, and

12. Loose Seams

a. Restitch all loose seams with sewing machine.

b. Tack all stitched seams.

13. Sealing of seams

a. Seal all restitched seams on the inside with an adhesive tape or a coating of sealant.

b. When tape is used, it will be centered over the center of seam.

B. Proper application and safety precautions when using sealant.

1. In waterproofing seam, where no tape is required, brush on a coat of seam sealant.

2. After the first coat of sealant has dried, apply a second coat.

3. When the seam sealant has completely dried, dust the entire area where sealant was applied with powdered mico, corn starch or talcum powder.

4. Caution should be taken when sealing seams, the procedures will be conducted in a well ventilated room in which no smoking is permitted and in which there are no open flames.

REPAIRING WET WEATHER WEAR

PRACTICAL EXERCISE

I. Introduction

During this period the instructor will demonstrate the production steps followed in the repair of wet weather items. Following the demonstration the student will perform a practical exercise of these items. The student will be encouraged to ask questions when doubt.

II. Study Reference

Information and procedures as set forth in this Workbook.

III. Tools, Supplies, and Equipment Required

Salvaged raincoats - (ample supply)

Salvaged ponchos - (ample supply)

Tailor's tool kit - (1 per student)

Cement - (ample supply)

31-15 Sewing Machine - (1 per student)

IV. Direction to Student

During the demonstration the student will listen, observe and ask questions when in doubt. During the practical exercise the student will be encouraged to call on the instructor for assistance when needed.

V. Performance Standards

The performance standards are established to be used by the instructor for checking student performance during the practical exercise. The instructor will also use the performance standards to inspect the final results for grading purposes.

VI. Job Breakdown

A. The performance standards established and which will be used by the instructor are as follows:

1. Replacement material of the same shade as the original item.
2. Buttonhole reinforced before application of patching material.
3. Corners of patches rounded off.
4. Seam sealant used on all newly applied seams.
5. Excessive adhesive brushed off.
6. Buttons replaced of the same size, and color of the original buttons.
7. Pocket openings reinforced before application of patch.
8. New hems applied are straight and the same width of the original hem.

B. The production steps to be followed during the practical exercise and repair of wet weather wear is listed to the left of the page. The key points to be remembered and applied during this period are listed to the right of the page.

Repair Methods

1. Patching.	1. a. Select material matching the original item. b. Cut a patch from matching material allowing a minimum overlap of ½" beyond edges of the damaged area. c. Apply a thin coat of adhesive to underside of patch and area of the item to be patched (allow the adhesive to dry to a tacky condition).

d. Place and then roll down the patch, over the damaged area with a roller, additional effort should be put on the edges of the patch.

e. Allow the excess adhesive around the area of patch to dry, and then remove with a stiff hand brush.

f. When applying a patch to wet weather wear, make certain all four corners of patch are rounded.

2. Buttons.

2. a. Buttons should be of a matching color and shade of the original.

b. Where buttons are torn out and the area damaged, apply a patch following procedures in paragraph 1a thru 1f above.

c. Replace the missing button by machine or hand sewing.

3. Buttonholes.

3. a. Damaged buttonholes will be reinforced by darning a piece of material under the damaged area on the buttonhole.

b. Apply a cement patch or adhesive tape over the buttonhole and damaged area (Patch or tape should extend over the edge of the item and to the underside of the buttonhole).

c. Cut out a new buttonhole of the original size (use buttonhole cutter).

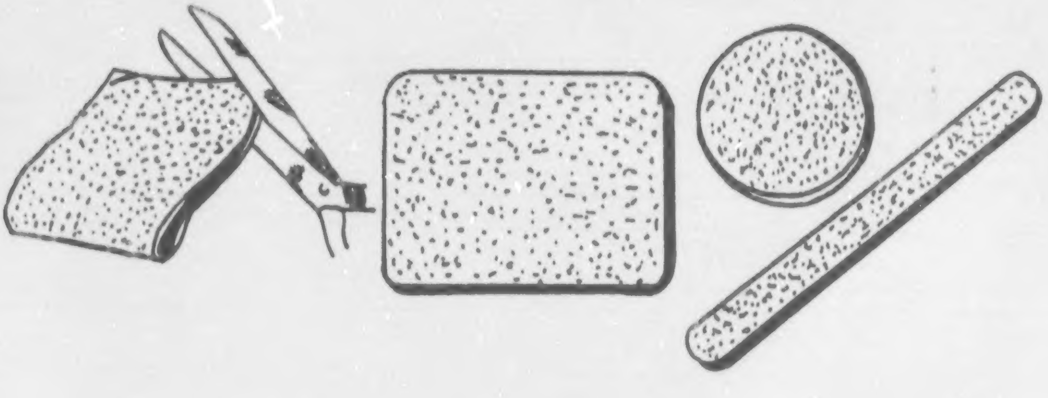
d. Sew a new buttonhole.

4. Pockets.

4. a. Pocket openings when damaged will be darned or sewn by machine.

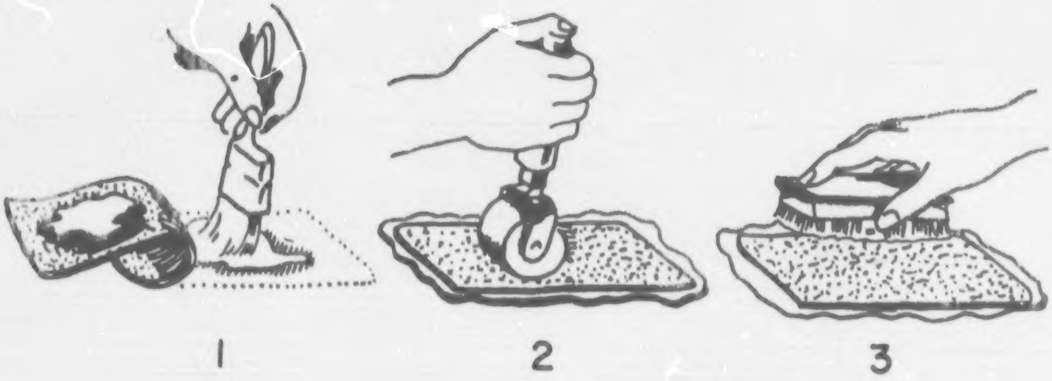
b. Select material matching the original raincoat.

	c. Apply a cement patch over the reinforced area following procedures as in paragraph 1a through 1f.
5. Hems.	5. a. Cut off worn or frayed hems (cut should be even and straight). b. Turn under a new hem, same width as the original hem. c. Stitch new hem using seam type #1. d. Seal the seams on the inside with a seam sealant.



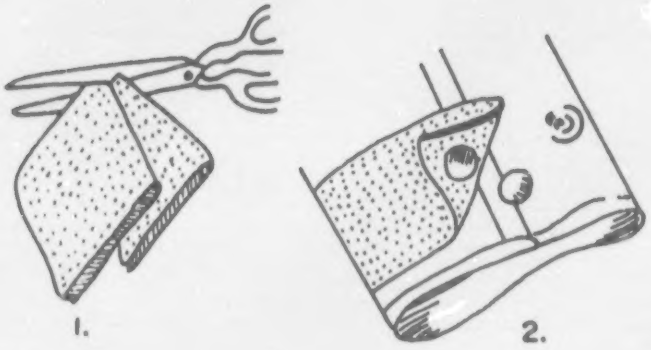
METHOD OF PATCH CUTTING

Figure 29



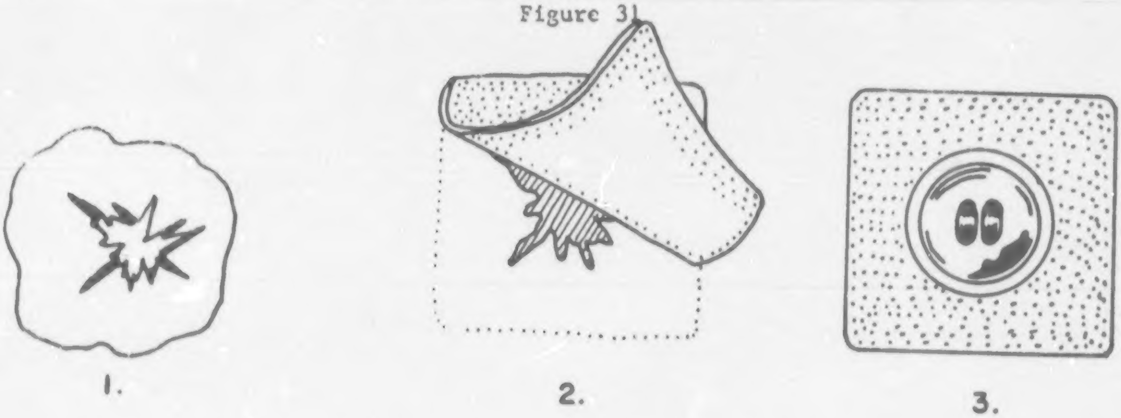
METHOD OF PATCH APPLICATION

Figure 30



METHOD OF PATCHING OVER RIVETS

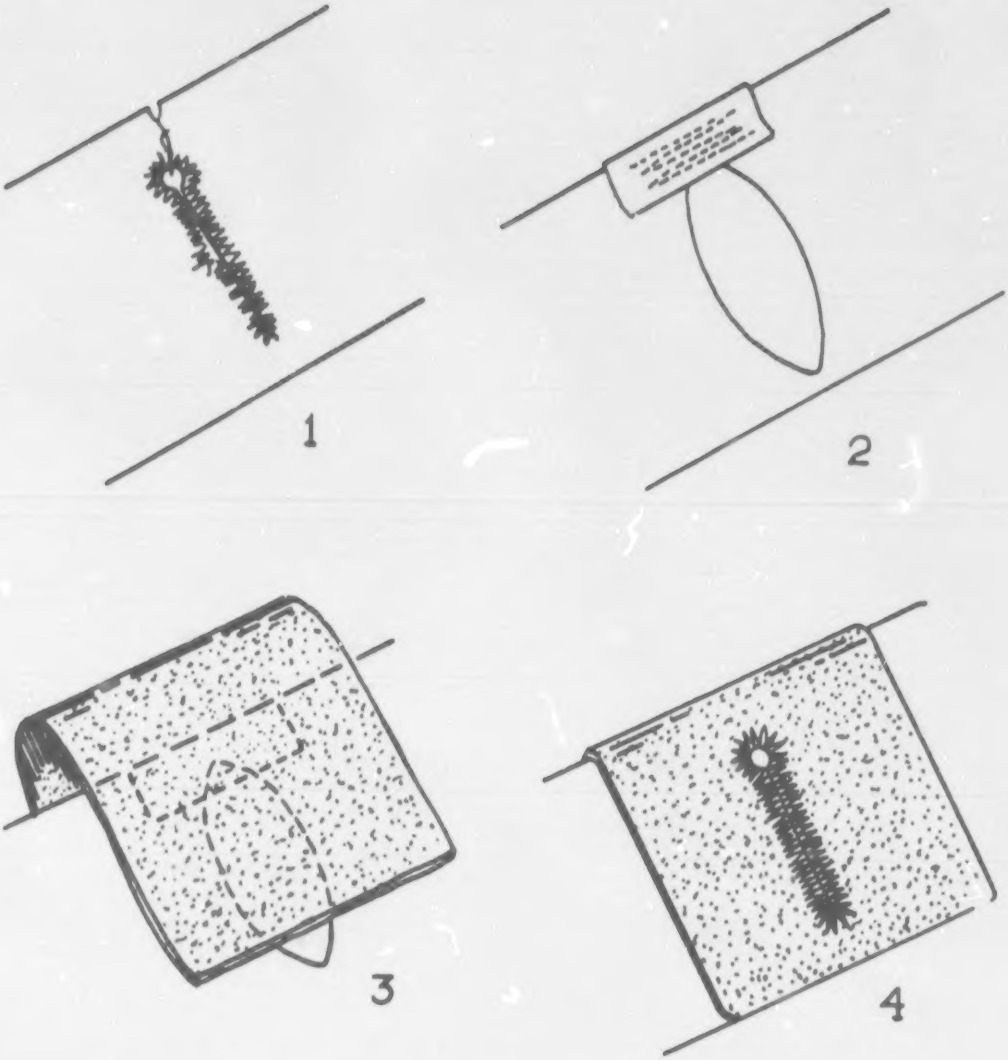
Figure 31



METHOD OF PATCHING WHERE BUTTONS ARE TORN OUT

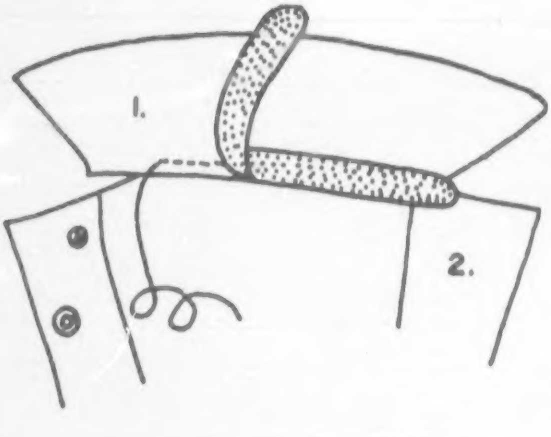
Patching over rivets and button holes.

Figure 32



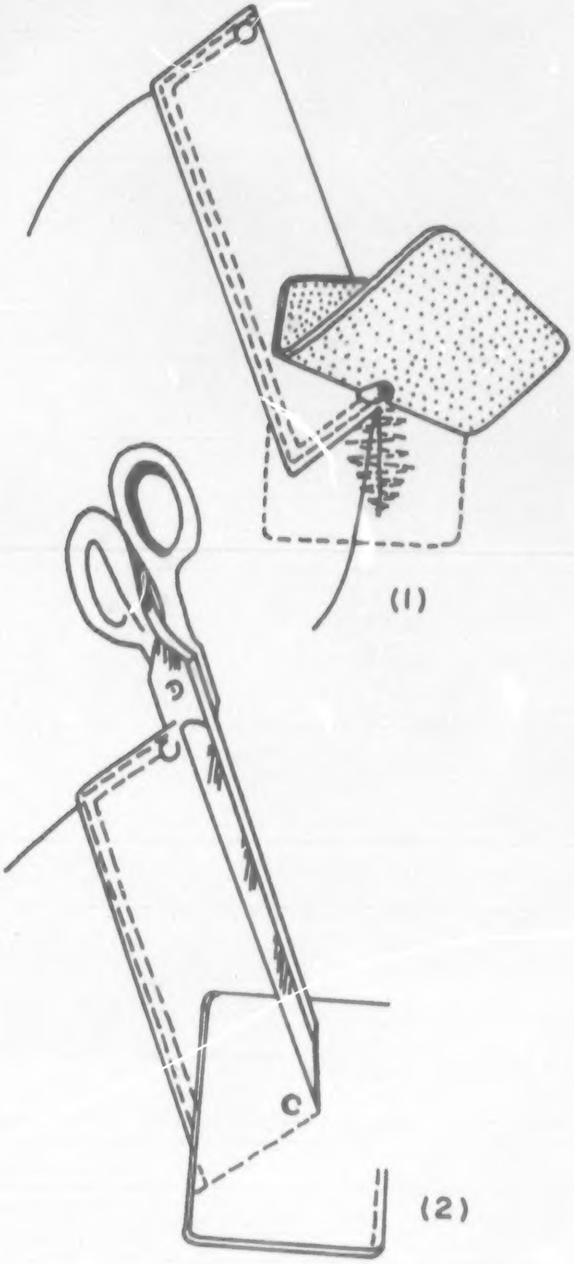
PATCHING DAMAGED BUTTONHOLES

Figure 33



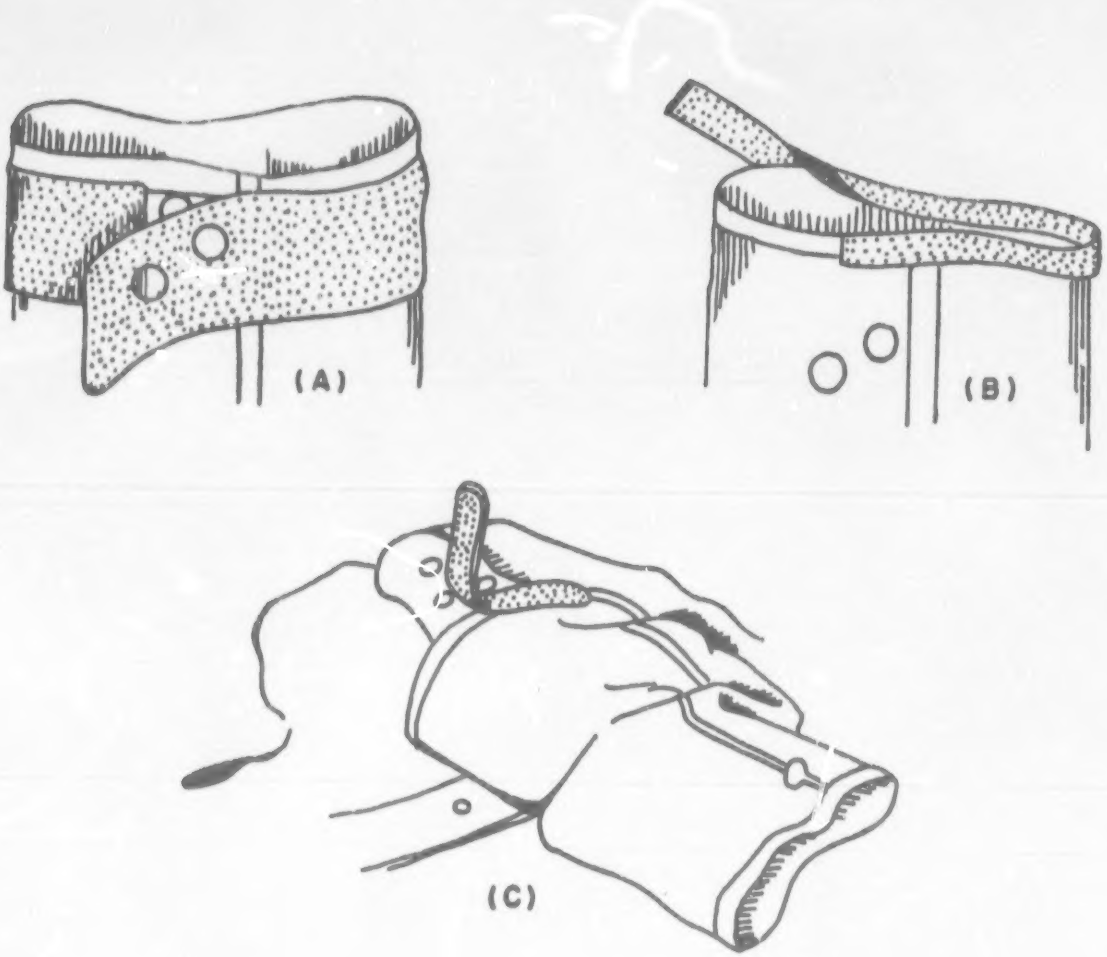
REPLACEMENT OF ENTIRE COLLAR

Figure 34

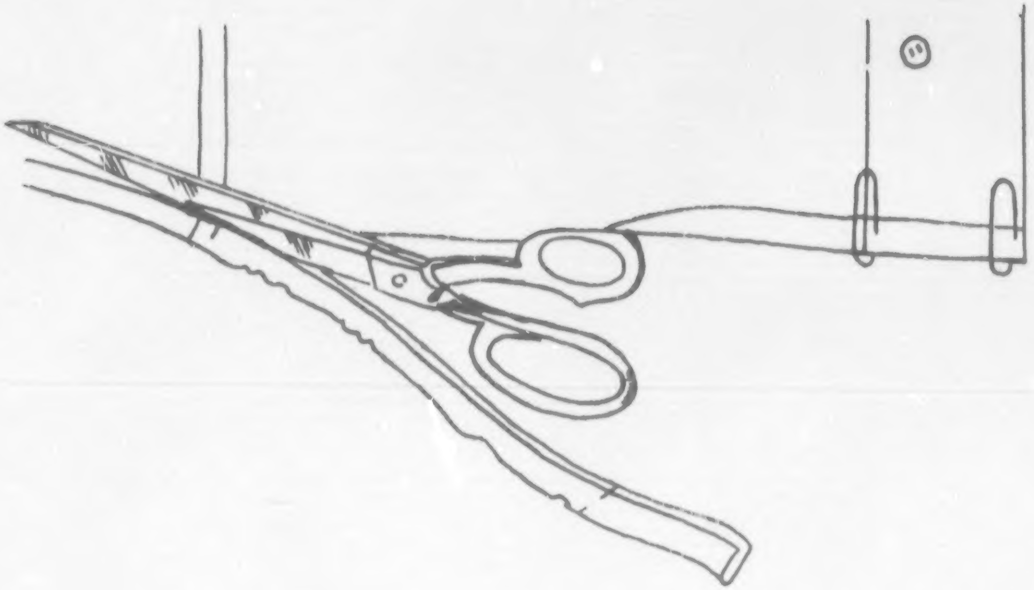


METHOD OF POCKET PATCHING

Figure 35



METHOD OF SLEEVE PATCHING
Figure 36



METHOD OF HEM CEMENTING

Figure 37

NOTE: SECTIONS 57 & 58 HAVE BEEN OMITTED DUE TO MILITARY SPECIFIC MATERIALS.

SECTION LIX

CLOTHING AND TEXTILE SHOP OPERATIONS

PRECIS

I. Introduction

A. Orientation and Motivation

1. During this period of instruction the instructor will discuss clothing and textile shop operations. This instruction will include setting up and operating a clothing and textile repair shop, classification, and repair operations.

2. At the time of your introduction to the course, or sometime during the course, the instructor told you what your assignment may be upon completion of this course. Regardless of the position to which you may be assigned, it is important that you understand this subject of Shop Operations.

3. In the field or in a theater of operations your primary mission will be to repair items of clothing for return to the user or returned to stock for reissue. This is normally accomplished on a large scale basis, therefore the most appropriate method would be on a production line basis. In order to operate on a production scale it is necessary to put into practical use all the subjects you have learned in the past weeks.

4. In the past several weeks you were taught how to repair and make a variety of alterations to the authorized items of clothing. The instructors also discussed the basic subjects to include: inspection, marking clothing defects, classification of clothing, fitting of clothing; measuring, resizing and folding of clothing, hand sewing, and maintenance of equipment. During this period you will learn how each of these subjects are an important factor in this practical exercise of shop operations.

B. Objective

As a result of this instruction, the student, given appropriate references, will describe the organization, mission, and functions of classification and repair operations of a clothing and textile repair shop; given a sequence of work flow, will determine the job assignments and describe the duties of personnel for each job assignment necessary to operate the clothing and textile repair shop; given appropriate forms, will set up a job order register for receiving and processing work order requests; given operating supply procedures and necessary publications, will determine shop stockage and control operating supplies by maintaining an up-to-date accumulation of consumption data; given a sample shop layout as a guide, will set up a shop for operations, with Station #1 (receiving, recording, and shipping), Station #2 (inspecting, classifying, and marking), Station #3 (repairing and altering), and Station #4(final inspection), assign each student to the various stations on a alternating basis using work requests and items submitted by individuals and units of the Post; and given appropriate tools, supplies, equipment, and references, the students will operate all four stations and perform necessary operator's maintenance to the satisfaction of instructors supervising the shop operations.

II. Presentation

A. The class will be set up for shop operations with the following personnel:

1. Shop Foreman
2. W/O Clerk
3. Inspector

4. Tailor

5. Repairman

a. Shop Foreman - Assign personnel to the various operating sections and supervise the performance of their duties. Under the direct supervision of the instructor.

b. Work Order Clerk - Will be responsible for receiving and shipping of work order requests submitted by individuals or units of the Post. Set-up and maintain a job order register.

c. Inspector - Inspect, classify and mark defects of items for repair. Final inspection, an important factor will be quality of workmanship.

d. Tailor - Acts as the keyman in the repair procedures. Determines and prepares the type of repair procedures to follow in unusual situations and work requests. Will personally perform the work on difficult alterations or repair.

e. Repairman - Will perform work on items of clothing as assigned to them, following repair procedures learned throughout the course.

B. Receiving of Clothing & Textile

A bonafide method of receiving clothing and textile in need of repair for shop operations mustbe established and continued. This will enable a shop to operate efficiently.

1. The first step in receiving a work request, the individual or organization must have a DA Form 2407 (Maintenance Request).

2. Work order clerk will carefully check the work request DA Form 2407. Make certain that it is properly filled and complete by the requesting unit.

a. Section I (Heading) the appropriate block should be checked or X put in the space provided.

b. Organization designator block should be marked with the appropriate number of the requesting unit.

c. Page number and total pages will be filled in.

d. Block 1.a - Designation of the organization making work request.

e. Block 1.b. - Location (Ex. Ft Lee, Va).

f. Block 1.c. - Organization Identification Code normally assigned a number by the support element.

g. Block 2 - N/A Normally used for serial numbered equipment or machinery.

h. Block 3 - noun, nomonclature of the item to be repaired (Example: Trousers, Wool AG 44).

i. Block 4 - N/A

j. Block 5 - N/A

k. Block 6 - Stock number of item listed in Block 3 (Example: 8405-255-6849).

l. Block 7 - Place an X in the appropriate space. STRAC units normally have priority over non-STRAC units.

m. Block 8 - N/A

n. Block 9 thru 13 - N/A

o. Block 14 - Use check or X in the appropriate box.

p. Block 15 - N/A

q. Block 16 - Describe nature of repair or alteration requested (Example: Sew Insignia), and total number of items.

r. Block 23 - Signature of individual authorized to submit the work request, also the Julian date request is submitted.

s. At this point the Work Order clerk will check the items in number and also check the items for the presence of a Repair Tag DD Form 754.

t. If everything on the DA Form 2407 is in the proper order, refer to Maintenance Request Register, DA Form 2405, select the next number in sequence and put that number in the upper left hand block of the (Maintenance Request) of DA Form 2407, and on each tag attached to the items for repair. (Example TR-5, TR meaning Textile Repair, and 5 being the number selected in sequence from the register).

u. Block 24 - Work Order clerk signature and Julian date when items were received.

v. Remove_copy 1 (Green) and give it to the requesting organization for his file copy and identification when picking up the completed items.

3. All clothing and textile received must be properly folded and marked for identification and placed in bins or laundry basket.

4. Make certain job order number is placed on each tag of the individual item.

5. Preparation of the Maintenance Request Register.

a. Column a - (Job Order Number) insert job order number in sequence (Example: 5).

b. Column b - (Quantity and Nomenclature) number of items received for repair (Example: 8 each, Shirt, Ctn, Khaki).

c. Column c - (Work Requested By) write the name of individual or organization making request (Example: 416th Signal Co. Ft Lee, Va).

d. Column d - (Serial or USA number) In this block insert the control number found in the block found in the upper left hand corner of the Maintenance Request DA Form 2407.

e. Column e - (Brief Description of Work) Write a brief description of the work required (Example: Cut sleeve of a shirt to 1/4 length).

f. Column f - (Date Job Order Received) Insert the date the items or request was received.

g. Column g - (Date repair started) The date the repair of the items was started.

h. Column h - (Date finished) The date the repair of the items was completed.

i. Column 1 - The last column of the register will be used for the signature of individual receiving the completed work request.

C. Repair of Clothing and Textile Items

1. The work order clerk will be responsible in the control of issuing items of repair to the student. The first number in sequence will be repaired first. In the event of an emergency for a high priority organization which for some reason has become alerted, then priority will be given to this unit.

a. In the block "g" of maintenance request register, the work order clerk upon issue of item to the student will insert the date repair started.

b. The work order clerk will insert the name of the student in block "f" of the maintenance request register.

2. The student, when issued an item, will be responsible for that

item until the repairs have been completed.

a. He will inspect the item for repairability.

b. Make and complete necessary repairs or alterations.

c. Show completed items to the instructor for grading purposes.

d. Return items after approval of the instructor, to the work order clerk and receive another item for repair.

3. After the clothing and textile items have been completed, the work order clerk will insert the date finished in block "h" of the maintenance request register DA Form 2405.

a. Work order clerk will place completed item in appropriate bin or basket.

b. Work order clerk will issue another item for repair to the student following same procedures described previously.

D. Shipping Items Repaired

1. When all items of the work request have been completed, the work order clerk will prepare the items and necessary paper work for the unit.

2. The work order clerk will call the unit to pick up completed work request.

3. Have the authorized individual who picks up completed work request sign block 24 (Received By) (Julian Date) on DA Form 2407, Maintenance Request. Pick up the receipt copy (Green) from the unit, and give the individual copy 4 (Blue) control copy.

CLOTHING AND TEXTILE SHOP OPERATIONS

PRACTICAL EXERCISE

I. Introduction

During this period the student will perform a practical exercise in clothing and textile shop operations. This will include setting up shop and operating with the appropriate stations, as specified by the instructor.

II. Study Reference

AR 670-5, AR 700-8400-1, AR 750-428, TM 10-3530-203-10, TM 10-700-8400-1, TM 38-750, DA Form 2404, DA Form 2405, DA Form 2407.

III. Tools, Supplies, and Equipment Required:

Tailor's tool kit (1 set per student)

31-15 sewing machine (1 per student)

Work Order log book (1 per class) w/inserts DA Form 2405

Clothing Repair Tags, DD Form 754 (ample supply)

Items of clothing received from individuals and/or units of the Post (ample supply)

IV. Direction to Student

During the practical exercise the student will rotate to the various stations under the direction of the instructor. The student is encouraged to ask questions when in doubt of his assigned task in the various stations. It is important that he understand the operation procedure of each section.

V. Performance Standards

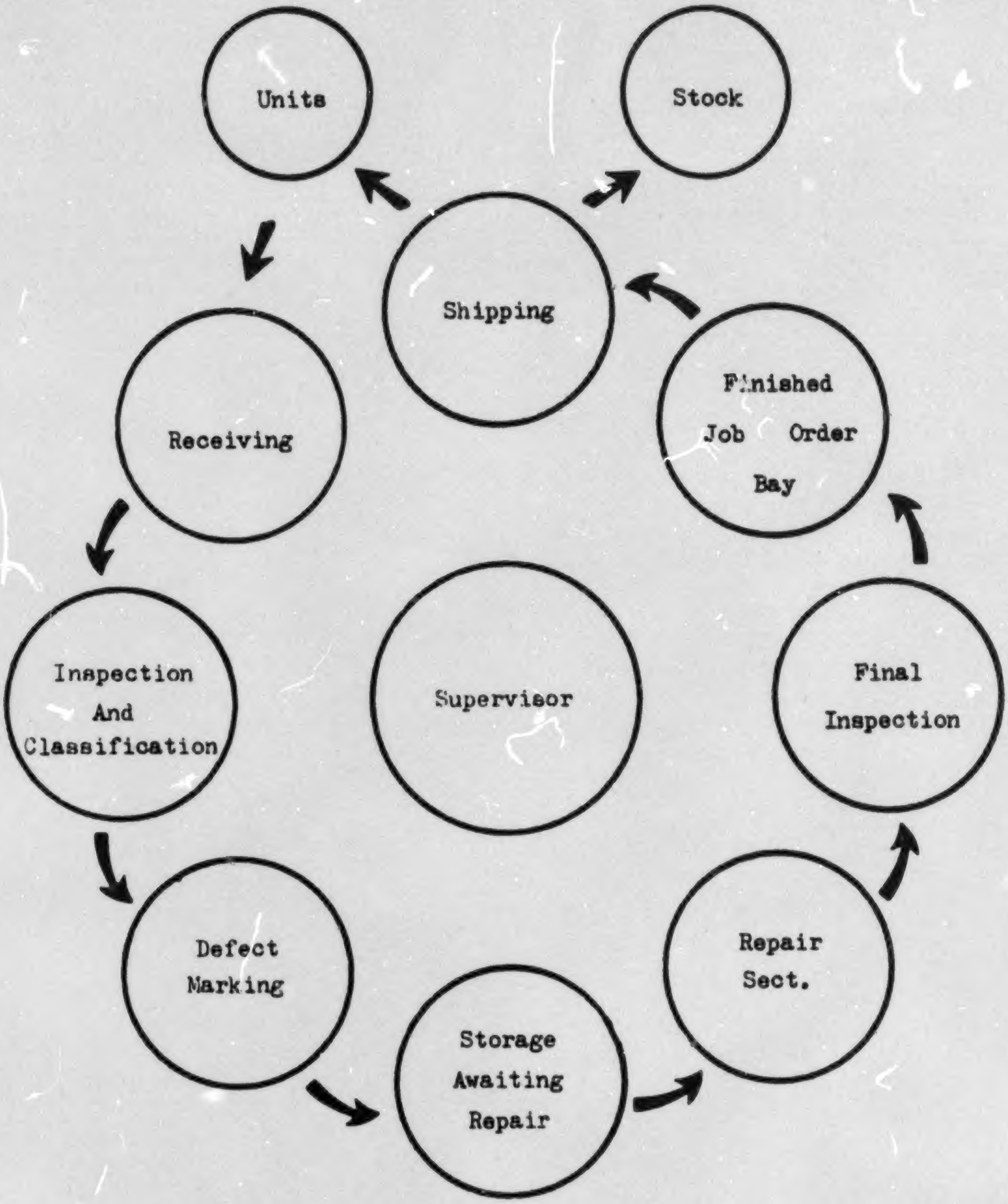
The instructor will use and follow the performance standards used for each subject and practical exercise performed throughout the course. These standards were established to be used by the instructor for checking student performance and for inspecting the final results of the practical exercises. The instructor will use the appropriate standards during this period for grading purposes.

VI. Job Breakdown

A. The instructor will use all previous performance standards that were utilized throughout the course.

B. During the practical exercise the student will have the opportunity to rotate on the various operations and stations as set-up by the instructor. The instructor-in-charge and his assistants will observe the students performance, maintain an even flow of work movement, and maintain a sufficient amount of work and supplies on hand at all times.

C. During the practical exercise the student is encouraged, if necessary, to refer to the production steps as set forth in this student workbook for assistance in performing an alteration or repair request assigned to him by the Shop Foreman and/or instructor.


Units
Stock
Shipping
Receiving
Finished Job Order Bay
Inspection And Classification
Supervisor
Final Inspection
Defect Marking
Repair Sect.
Storage Awaiting Repair

WORKFLOW CHART

Figure 58

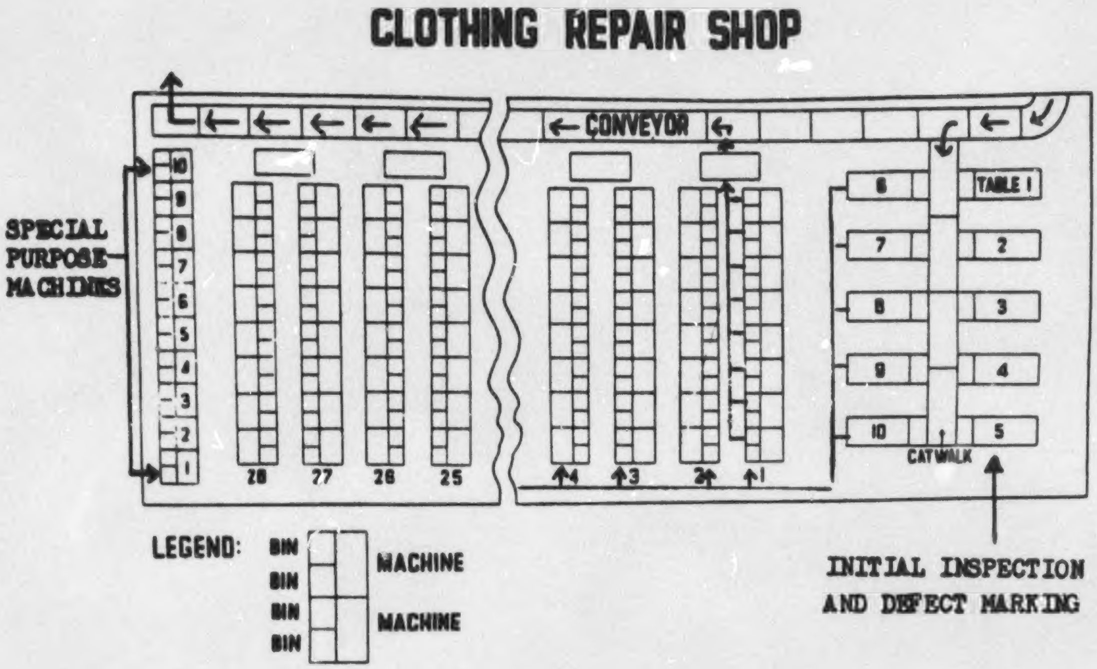

CLOTHING REPAIR SHOP
CONVEYOR
SPECIAL PURPOSE MACHINES
10
9
8
7
6
5
4
3
2
1
28
27
26
25
4
3
2
1
TABLE 1
2
3
4
5
6
7
8
9
10
CATWALK
INITIAL INSPECTION AND DEFECT MARKING
LEGEND:
BIN
BIN
BIN
BIN
MACHINE
MACHINE

Figure 59 - Layout Clothing Repair Shop (fixed shop)